FOUNDRY TRADE JOURNAL
Established 1902
WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

Vol. 84 Thursday, April 15, 1948 No. 1650

49, Wellington Street, London, W.C.2
'Grams: "Zacatecas, Rand, London"
'Phone: Temple Bar 3951 (Private Branch Exchange)
PUBLISHED WEEKLY: 21s. per annum (Home and Overseas)

How Foundries now Develop—II

So much importance is to be attached to the working of the Steering Committees, that we feel that this, the first, opportunity should be taken of clarifying several points. First there is need to emend last week's phrase "We understand that any ironfoundry can spend up to £2,000 on new plant each year without going through this procedure." Actually, this amount may be a firm's own maintenance allowance which is granted by the Ministry of Works and varies with the size of the undertaking. Thus, if a firm wishes to install plant which requires foundations, even at a cost of £50 or indeed anything over £10, and does not wish to make use of its maintenance allowance, then it is necessary to apply for a building licence for the amount. The cardinal point is that capital expenditure on plant enters very largely into the issue, and whereas there is no control upon anyone wishing to spend thousands of pounds upon machinery and furnaces at the present time, they cannot very well do this unless they have some place in which to install the plant. Therefore, even though there be only a small amount of money envisaged for foundations, a licence is still required, and it is through this licence that the authorities exercise the control of plant installation.

A second point is that instead of stressing "production and economy," we should have laid the emphasis on "efficiency." Thus applications relating to the installation of the newer methods of malleableising or the modernising of obsolete furnaces are typical examples of where efficiency is the guiding principle. There is no need for foundry owners to be scared of the present method, because ever since 1939 controls have operated, and the existing set-up is meeting with increasing approbation by applicants. Now, at least, schemes are placed, initially before a committee of men well versed in the routine, the requirements and the basic reasoning to be associated with any scheme. Moreover, the members are not civil servants of the type who have a preference for saying "no." The fact that they are prominent in the industry makes them, not merely sympathetic towards efficiency, but inherently enthusiastic.

It is obvious from a perusal of our columns, week by week, that static conditions within the industry have not yet been established, nor is there reason to believe that they ever will be. Since our last issue, there have been, *inter alia*, the opening up of a new mechanised foundry in Nottingham, and washing and bathing amenities at a Yorkshire concern. This being quite a normal week, it should make foundry owners aware of the fact, that if they have a scheme making for increased efficiency in the production of iron castings, there is every reason for them to go ahead and place it before their Regional Steering Committee. Obviously it must be realistic, for it can be presumed that it would be against Government policy to sponsor a gamble, even though it were a good one. That type of free enterprise must be deferred until all the pertinent controls disappear.

Contents

How Foundries Now Develop—II, 361.—The Institute of British Foundrymen—Annual Conference in London, 362.—A Bashful Moulder, 363.—The Roosevelt Statue, 364.—Forthcoming Events, 364.—The Late Mr. F. J. Cook, 364.—Cerium in Cast Iron, 364.—The Flowability of Moulding Sand with Special Reference to the Shatter Test, 365.—More Foundry Amenities, 367.—London Students' Vacation Scheme, 368.—Forming the Runners and Pouring, 368.—National Conference on Industrial Safety, 368.—Recent Technical Developments in the Production of Iron Castings, 369.—A New Publication, 370.—I.B.F. Scottish Branch Annual Meeting, 371.—Notes from the London Sections, 372.—Gaseous Annealing of Malleable, 372.—Aluminium Casting Design Factors, 373.—A Problem in Running, 375.—A Note on Risers, 375.—Book Reviews, 376.—Publication Received, 376.—The Emergency Laws (Miscellaneous Provisions) Act, 1947, 377.—Correspondence, 377.—Petrol for C Licence Holders, 377.—Company News, 378.—German Foundry Production is Doubled, 379.—Contract Open, 379.—Personal, 380.—News in Brief, 382.—Rhodesian Iron Development Plan, 382.—Increases of Capital, 384.—Obituary, 384.—Raw Material Markets, 386.—New Companies, 386.

The Institute of British Foundrymen

Annual Conference in London

The 45th Annual Conference of the Institute will be held in London from June 8 to 11, 1948, and is being arranged by the London Branch of the Institute. The Conference Office will be established at the Cafe Royal, Regent Street, London, W.1, on Tuesday, June 8. Communications prior to this date should be addressed to the Institute's head office, St. John Street Chambers, Deansgate, Manchester, 3. The Conference Office at the Cafe Royal will open for the issue of tickets, booklets, Papers, information, etc., at the following times:—Tuesday, June 8, 2 p.m. to 6 p.m.; Wednesday, June 9, 9 a.m. to 12 noon and 2 p.m. to 4 p.m.; Thursday, June 10, 9 a.m. to 12 noon. The telephone number of the Conference Office is REGent 8240, and the Conference Office will be the Club Room, third floor.

PROGRAMME

Wednesday, June 9

9.30 a.m.: Annual general meeting in the Louis Room, Cafe Royal, Regent Street, London, W.1 (members only). Presentation of awards.

10.50 a.m.: Presidential address by Mr. R. B. Templeton, M.I.Mech.E.

11.45 a.m.: Edward Williams Lecture, "Some Solved and Unsolved Problems in the Metallurgy of Blackheart Malleable," to be delivered by Dr. H. Schwartz, of Cleveland, Ohio (Paper No. 897).

12.45 p.m.: Luncheon in the Napoleon Suite, Cafe Royal, Regent Street, London, W.1 (members and ladies).

2.30 p.m.: Technical sessions in the Louis and Nicol Rooms, at the Cafe Royal, Regent Street, London, W.1. Session A (in the Louis Room): Papers Nos. 898, 899, 900 and 901. Session B (in the Nicol Room): Papers Nos. 902, 903, 904 and 905.

7.0 p.m.: Reception by the President and Mrs. Templeton prior to the annual dinner and dance, in the Napoleon Suite and Empire Room, at the Cafe Royal, Regent Street, London, W.1.

7.30 p.m. to 1.0 a.m.: Annual dinner, in the Napoleon Suite and Empire Room at the Cafe Royal, followed by dancing (members and ladies; evening dress).

Thursday, June 10

9.15 a.m.: Technical sessions in the Louis and Nicol Rooms at the Cafe Royal, Regent Street, London, W.1. Session C (in the Louis Room), Papers Nos. 906, 907, 908 and 909. Session D (in the Nicol Room), Papers Nos. 910, 911, 912, 913 and 914.

12.30 p.m.: Luncheon in the Napoleon Suite, Cafe Royal, Regent Street, London, W.1 (members and ladies). After luncheon coaches depart at the times stated from Leicester Square (south and west sides) for the following works visits. It is possible for members to take part in one only of the visits: 1.30 p.m. (1) J. Stone & Company, Limited, Charlton (non-ferrous founders); (2) National Physical Laboratory, Teddington, Middlesex. 1.45 p.m.: (3) R. & A. Main, Limited, Gothic Works, Edmonton, N.18 (manufacturers of gas cookers; modern mechanised foundry making "light" castings). 2.0 p.m.: (4) Ealing Park Foundry, Junction Road, South Ealing, London, W.5 (high-duty ironfounders; cast crank shafts); (5) Glacier Metal Company, Limited, Alperton, Wembley (non-ferrous founders; makers of bearings). Coaches from all the above visits will arrive back at Leicester Square from 5.45 to 6.15 p.m., except coaches from J. Stone & Company, which will arrive at 6.30 p.m. Evening free.

Friday, June 11

Members may participate in one only of the following visits or groups of visits:—

8.12 a.m.: Depart by train from Liverpool Street Station (breakfast may be had on the train) for Ipswich to visit (6) (*a*) Crane, Limited (malleable ironfounders; boilers, radiators, tube fittings) (morning); and (*b*) Ransomes, Sims & Jefferies, Limited (agricultural engineers). Visit to new foundry under construction (afternoon). Train due Ipswich 10.4 a.m.; return from Ipswich 5.0 p.m., arriving Liverpool Street 6.51 p.m. Luncheon and coaches in Ipswich by kind invitation of Messrs. Crane, Limited. Members who desire to return to London earlier may leave Ipswich by train at 3.19 p.m., arriving Liverpool Street Station at 5.10 p.m., but it will be necessary for them to pay single fare, as the return bulk ticket at reduced rate is available only for the train at 5.0 p.m. Coaches depart at the times stated from Leicester Square (south and west sides) for the following visits:—

9.0 a.m. (7) (*a*) J. & E. Hall, Limited, Dartford (refrigeration engineers) (morning); and (*b*) Fraser & Chalmers Engineering Works (General Electric Company) (high-class electrical and general engineering iron castings) (afternoon). Luncheon by kind invitation of Messrs. J. & E. Hall, Limited. Arrive Leicester Square on return about 6.0 p.m.

9.30 a.m. (8) (*a*) Langley Alloys, Limited, Langley, Slough, Bucks (non-ferrous founders) (morning); and (*b*) High Duty Alloys, Limited, Slough (aluminium founders) (afternoon). Luncheon by kind invitation of Messrs. High Duty Alloys, Limited. Arrive Leicester Square on return about 6.0 p.m. (9) (*a*) Ealing Park Foundry, Junction Road, South Ealing, W.5 (high-duty ironfounders) (morning); and (*b*) British Bath Company, Limited, Greenford (bath manufacturers, mechanised; enamelling shop) (afternoon). Luncheon by kind invitation of both companies. Arrive Leicester Square on return about 5.30 p.m.

10.15 a.m.: (10) Lake & Elliot, Limited, Braintree (steel and high-duty ironfounders). Arrive 12.15. Luncheon by kind invitation of the company. Visit at 1.30 p.m. Return to London by coach 4.0 p.m., arriving Leicester Square about 6.0 p.m.

10.30 a.m. (11) Ford Motor Company, Dagenham (large, highly mechanised ironfoundry). Journey by steamer on River Thames. Depart Westminster Pier, 10.30 a.m. A lecturer will describe places of interest *en route*. Fare, including luncheon and tea, £1 per person.

7.30 for 8.0 p.m. to 1.0 a.m.: Supper dance and cabaret in the Napoleon Suite and Empire Room at the Cafe Royal, Regent Street, London, W.1 (members and ladies). Evening dress.

LADIES' PROGRAMME

WEDNESDAY, JUNE 9

11.30 a.m. to luncheon time: Coffee at the Cafe Royal, Regent Street, by kind invitation of the London Branch.

12.45 p.m.: Luncheon, Cafe Royal (members and ladies).

2.30 p.m.: Performance of "Oklahoma," Drury Lane, Theatre Royal. Number of available tickets is limited (ladies make their own way to the theatre).

7.0 p.m. to 1.0 a.m.: Annual banquet at the Cafe Royal, followed by dancing (members and ladies). Evening dress.

THURSDAY, JUNE 10

11.0 a.m.: Visit to the Royal Academy, Piccadilly. Admission and morning coffee by kind invitation of the London Branch. No organised time of assembly. Ladies arrive and depart at their own convenience.

12.30 p.m.: Luncheon, Cafe Royal (members and ladies).

3.30 p.m.: Assemble at Derry & Toms, Limited, department store, High Street, Kensington, London, W.8. Tour of departments, including canteen and welfare. Tea by kind invitation of Mrs. Templeton.

FRIDAY, JUNE 11

11.0 a.m.: Depart Westminster Pier by steamer for Kew Gardens. Luncheon and tea on board the steamer or in Kew Gardens.

4.45 p.m.: Arrive Westminster Pier on return.

7.30 for 8.0 p.m. to 1.0 a.m.: Supper, dance and cabaret, Cafe Royal, Regent Street (members and ladies). Evening dress.

PROGRAMME OF PAPERS

WEDNESDAY, JUNE 9

2.30 p.m. to 5.15 p.m.: Session A (in the Louis Room, Cafe Royal):—No. 898, "Nodular Cast Irons, their Production and Prospects," by H. Morrogh and J. W. Grant (British Cast Iron Research Association); No. 899 "A Quantitative Study of the Residual Gases in Cast Iron," by Dr. R. V. Riley (Staveley-Bradley Foster Research Department); No. 900, "Plastic Flow in Cast Iron at Room and Elevated Temperatures, with Special Reference to Relief of Stress," by C. R. Tottle (King's College, University of Durham); No. 901, "The Maurer Diagram and Its Modifications," by H. Laplanche, *Docteur-es-sciences* (Exchange Paper from *Association Technique de Fonderie de France*). Session B (in the Nicol Room, Cafe Royal):—No. 902, "Steel Castings for Aircraft," by E. J. Brown, A.I.M., and F. Rodgers, A.Met., A.I.M. (Hadfields, Limited); No. 903, "Steel Casting Cleaning Methods," by A. B. Lloyd (F. H. Lloyd & Company, Limited); No. 904, "Gas Porosity in Nickel-silver Castings," by T. F. Pearson, W. A. Baker and F. C. Child (British Non-Ferrous Metals Research Association); No. 905, "Aluminium Alloy Casting Developments," by E. G. West, Ph.D., B.Sc. (Aluminium Development Association).

THURSDAY, JUNE 10

9.15 a.m. to 12.15 p.m.: Session C (in the Louis Room, Cafe Royal):—No. 906, "Refractory Materials in the Foundry Industry," by A. T. Green, O.B.E., F.R.I.C., and Dr. G. R. Rigby (British Refractories Research Association); No. 907, "Problems of Contraction and Distortion in Cast Iron Castings," by E. Longden; No. 908, "New Ladle Methods of De-sulphurising Pig-iron," by Dr. W. C. Newell (British Iron and Steel Research Association); No. 909, "Bath Making," by A. Young (Short Paper and film) (British Bath Company). Session D (in the Nicol Room, Cafe Royal):—No. 910, "Some Fundamental Problems in Foundry Planning," by Jorgen Drachmann (*Aktiebolaget Scenska Strebelverken, Sweden*); No. 911, "Do You Use Your Cost System?" by Ralph L. Lee (chairman, A.F.A. Costing Committee (Exchange Paper from American Foundrymen's Association); No. 912, "Metallising in Relation to Foundry Practice," by J. Barrington Stiles (the Metallising Equipment Company); No. 913, "Application of the Brinell Test in the Foundry," by J. Leonard, *Ingénieur Civil des Mines, President d'honneur de l'Association Technique de Fonderie de Belgique* (Exchange Paper from the *Association Technique de Fonderie de Belgique*); No. 914, "Manufacture of Gravity and Pressure Die Blocks in Nickel Chrome Iron," by H. J. Woodman (Magnal Products, Limited).

A Bashful Moulder

Early in 1944, Flight Lieutenant L. Park, R.A.F. (V.R.), was awarded the D.F.C. for high skill, fortitude and devotion to duty. He was invited to Buckingham Palace to receive his decoration, but being of a very modest disposition, he excused himself. On demobilisation, Flight-Lieutenant Park, who obtained his commision in 1943, returned to his peace-time occupation as a moulder at Head Wrightson Steel Foundries, Limited, Stockton-on-Tees. He recently received through the post his D.F.C.

The index for the FOUNDRY TRADE JOURNAL, Volume 83, September to December, 1947, is now available, and early application should be made to 49, Wellington Street, London, W.C.2, to secure a copy.

The Roosevelt Statue

The Roosevelt statue which was unveiled last Monday in Grosvenor Square, London, by Mrs. Roosevelt was designed by Sir William Reid Dick and cast in bronze by the Morris-Singer art foundry, of which Mr. A. L. Parrott is manager.

LAST NIGHT Dr. A. B. Everest gave a lecture to the *Association Technique de Fonderie de Belgique* in Brussels, on the subject of Tests and Specifications for Cast Irons in Great Britain. He repeats the lecture to-night in Liège.

Forthcoming Events

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

APRIL 20.

Sheffield Metallurgical Association.

"Some Applications of the Supersonic Frequency Dectector in Steelworks Inspection," by F. Turner, at 198, West Street, Sheffield, at 7 p.m.

APRIL 21.

North-Western Fuel Luncheon Club.

"The Technical Relationship between Coal and Fuel Oils," by J. A. Oriel, C.B.E., M.C., M.A., at the Engineers' Club, Albert Square, Manchester, at 12 noon for 12.45 p.m.

Institution of Production Engineers.

Birmingham Section:—"Cast Iron as an Engineering Material," by H. T. Angus, Ph.D., M.Sc., at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 7 p.m.

The Institute of Fuel.

Yorkshire Section:—Annual General Meeting, followed by the Chairman's Address, at the Royal Victoria Station Hotel, Sheffield, at 3 p.m.

APRIL 22.

Royal Statistical Society—Industrial Applications Section

Tees-side Sub-Group:—"Some Applications of Statistical Methods to Refractory Test Data," by J. Mackenzie, at 7 p.m., at the Cleveland Scientific Institute, Middlesbrough.

APRIL 24

Institute of British Foundrymen.

West Riding of Yorkshire Branch:—Annual General Meeting and Election of Officers, at the Technical College, Bradford, at 6.30 p.m.

The Late Mr. F. J. Cook

At the memorial service, prior to the interment of Mr. F. J. Cook, held at St. Mary's Church, Bearwood, last Thursday, the Institute of British Foundrymen was represented by Mr. V. C. Faulkner, Mr. J. T. Goodwin, O.B.E., Mr. J. W. Gardom and Mr. D. H. Wood, past-presidents, and Mr. T. Makemson, M.B.E., secretary; the local branch by Mr. A. G. Harrison, its president, and the British Cast Iron Research Association by Mr. W. B. Parkes. As the deceased had many Masonic interests, there was a large number of brethren representing the various crafts and lodges. The service, conducted by the Rev. J. Jones, was particularly impressive.

Cerium in Cast Iron

At a meeting of the Society of Public Analysts and Other Analytical Chemists, held recently in Burlington House, Piccadilly, London, W.1, a Paper was presented by W. Westwood, B.Sc., and A. Mayer (both on the staff of the British Cast Iron Research Association) detailing the method for determining cerium in cast iron.

After briefly reviewing previous information on this subject, the Authors described their method in detail. It is based on a colorimetric (Spekker) determination of the brown complex formed when cerium containing solutions are agitated, under suitable conditions, with 8-hydroxyquinoline solution. The latter is prepared in solution with chloroform and 10 per cent. acetone. Further information was given on the precise method for preparing the buffer solution of the correct *p*H value and of the procedures for dealing with interference from other elements which might originally be present.

The Flowability of Moulding Sand With Special Reference to the Shatter Test

Test gives additional evidence for Sand Control Methods

At the February meeting of the Birmingham, Coventry, and West Midlands Branch of the Institute of British Foundrymen, over which Mr. A. G. Harrison (Branch-President) presided at the James Watt Memorial Institute, Birmingham, Mr. E. L. Graham, of the Coneygre Foundry, Limited, Tipton, read a Paper on "The Flowability of Moulding Sand with Special Reference to the Shatter Test for Controlling Properties." Introduced by the Branch-President, Mr. Graham emphasised how in these days of mechanised foundries and technical control in the field of moulding materials, sand control for jolt squeeze machines and Sandslingers was essential. Although the control of sand for such machines was not new, the introduction of new labour to the industry meant that control of the process of preparing sand was of major importance.

Scope of Sand Testing

The obvious necessity for all raw materials to be within set limits for certain properties arose. The moulder and coremaker alike needed a consistent sand so that the human element was eliminated as far as possible. It was true that foundries still existed which relied on the skill of the old moulder and rule-of-thumb methods, but even these were beginning to realise the time would come when laboratory control must be applied. That, furthermore, was essential if the new automatic moulding machines were installed. The laboratory could control the variables within limits depending on the tools and plant available, and, of course, on the knowledge and skill with which all test results were interpreted. That need not necessarily entail a considerable number of tests with elaborate and expensive apparatus. The object of this Paper was to show how the properties might be controlled by means of simple testing which would show the full properties of a sand. Some tests were already standard in the U.S.A. and the United Kingdom, and covered green compression, shear, and sometimes tensile strength; permeability and dry strength. Although the measurement of flowability and plasticity was not easy, the shatter test was one that would measure the "mouldability" of a sand, and that covered both flowability and plasticity together.

The Shatter Test

Mr. Graham then exhibited slides depicting the Shatter Tester, and described its operation. The test was stated to be well-known and in use in a few foundries. Many however, did not appreciate the basic principles, so the necessity arose for a full explanation of the method of applying those principles. The non-technician could use the test for consistency control of naturally-bonded sand mixtures, but for the control of synthetic mixtures more data was required. The well-equipped laboratory could investigate all properties, and so formulate the data for establishing a basis for working limits.

In dealing with graphs of properties of various bonded sands he pointed out that the significant fact established by the one illustrating the properties of a naturally-bonded red sand, for a working range of moisture, was the crossing of the two curves—green strength and shatter—(under the standard conditions of expression) which corresponded to the point of maximum permeability. That was known as the working point, and a limit of plus or minus 0.5 per cent. was ideal, but plus 1.25 per cent. or minus 5 per cent. would be satisfactory under normal conditions. The graph illustrating a mixture of red sand and a silica sand plus 2 per cent. of bentonite showed an improved average shatter value, being between the 70 and 80 per cent. limits. That range had been established by practical trials, and was a sound basis for the best results on machine moulding.

Influence of Coal Dust

Explaining the graph relating to the same basic mixture plus 5 per cent. of coal dust, Mr. Graham remarked that coal dust obviously lowered the permeability, but that the sand was still sufficiently permeable for the majority of applications; green strength and dry strength were raised, and the shatter value was somewhat higher. The mixture would be satisfactory if a range of 3½ to 4½ per cent. were maintained, when moulds would have a uniform mould hardness and rammed density for a given number of jolts. Once that mixture had had its properties adjusted, a routine check for moisture content and shatter value would give the necessary control, provided milling time was fixed. The additions of new sand and bond should be accurately weighed.

Synthetic Bonding for Sands

In the graphs illustrating two types of bentonite (U.S.A. and N.A.) in Congleton sand, in which 5 per cent. was used as the addition, Mr. Graham said the high green and dry strengths with high shatter value were the features of that type of clay. The working moisture range was fairly narrow. He also showed graphs of Wyoming bentonite in sea sand and in Congleton sand for comparison of the various properties. He considered noteworthy the improvement of properties with the Congleton sand which was not so uniform as sea sand (80 per cent. on 100 mesh), but had grains spread on 60 to 100 and 150 mesh.

A 7.5 per cent. addition of Kingbond to both sea and Congleton sand was a good clay addition for certain classes of work; there, again, better properties were yielded. A 5 per cent. addition of Kingbond plus 2 per

Flowability of Moulding Sand

cent. of bentonite in sea sand and in Congleton sand was an economical admixture for synthetic sands. The shatter value was good on the sea sand mixture, but rather higher on Congleton. That could be adjusted by reducing the bentonite slightly and increasing the Kingbond.

In the next slide Fulbond No. 2 and Colbond were added to the uniform-grained sea sand, and the amount added varied by 4 per cent. The weaker clay, Colbond, was also suitable for use in conjunction with bentonite or with Fulbond No. 2. A blend of the two types was desirable, and should be of (1) a Montmorillonite, bentonite or Fulbonds; (2) a kaolinite, Colbond or Kingbond. A mixture was necessary because for the ideal moulding sand having good flowability a montmorillonite clay alone would give too high a shatter value, thus flowability would be poor. A kaolinite clay alone would give too low a shatter value, and poor lifts and pattern draws would result. A mixture of the two would provide the required properties: adequate green compression and tensile—and also a medium dry strength which permitted easy shake-out.

After showing graphs of naturally-bonded and synthetic system sands showing the range of moisture for desired properties and the fine limits needed for the synthetic mixture, Mr. Graham exhibited a slide showing test-pieces of moulding sand indicating loose packing due to poor flowability (shatter 83 per cent.) in the one and uniform ramming in the other (shatter 76 per cent.). In the case of the loosely packed test-piece, the mixture was faulty due to a sand being taken from a source where milling facilities were inadequate. Here a large amount of clay was being added to give a desired green strength in a short milling time. The result was a build-up of dead clay, much clay never having been used to its optimum bonding power, and where the sand felt dry even when 5.5 to 6.5 per cent. moisture was added. The well-rammed specimen was from a source where milling was adequate and the clay maintained at a minimum; here also approximately 10 per cent. new sand was added per cycle to prevent build-up of fines. A moisture range of 4.0 to 4.5 per cent. gave good flowability with a light silky feel to the sand.

Next came slides showing characteristics for a synthetic sand milled for two and for five minutes, and the milling time required for a bentonite and a kaolinite clay.

Core Sand Selection

Mr. Graham emphasised that core-sand mixtures presented the same problems, and selection of bonding materials to give good flowability was just as essential as in a moulding sand. He showed slides of two examples. The porous, badly-packed, one was made from a mixture containing a semi-solid compound and which, when tested, had a shatter value of 93 per cent. The well-rammed core was made from a mixture containing linseed oil and G.B. Kordek, and was used in a core blower where high flowability was essential, shatter value being 74 per cent.

Three other slides showed a green compression test on a sand made up of 7.5 per cent. Kingbond and Congleton sand at 2 per cent. moisture, the inadequate shatter value of the mixture resulting in the test-piece disintegrating almost completely (green strength, 8 lb. per sq. in.); 5 per cent. of bentonite in Congleton sand at 2 per cent. moisture in which the green strength was the same, but adequate shatter value caused proper rupture of the test-piece, and a special moulding sand, having very plastic properties and a shatter value of 98 per cent., the test-piece bulging without fracturing.

The final slides depicted a mechanised sand plant suitable for close control of moulding sand. The additions of clay and new sand should be standardised for the convenience of the mill operator. Timing gear should be fitted to each mill with visible lights indicating the milling period. A record board situated at the sand mill was for the benefit of the mill operators and foundry foreman; it showed the trend of results, and uniform figures gave the foreman encouragement.

Basic Requirement for a Synthetic Sand

Mr. Graham pointed out that the basic need was the selection of a suitable silica sand which, if possible, could be used for both cores and moulds. If preference or accident of location demanded a mixture of two sands, the coarser material should be used for the cores. That often led to economy in core binders. The knocked-out cores, when disintegrated, could be used as a part addition of new sand, and the second part, the finer sand, could be added to yield the distribution of grain size required in the moulding sand. Next, the clay binder should be selected, according to the characteristics required to suit the castings produced and type of metal poured. Moulding methods should also be taken into account. Some suitable sands were:—Congleton, for both cores and moulds; Bedford 9F for cores; Bedford 9F plus 26A for moulds; and Arnolds No. 52 plus Kings Lynn for cores and moulds. Alternatively, for example, Congleton sand could be used for cores, and a mixture of Congleton and a naturally-bonded sand plus a selected clay for the moulds. If a high coal-dust content was favoured for a smooth skin, more new silica sand, say 10 per cent., would be added per cycle. The addition of 1 to 2 per cent. of fuel oil would enhance the flowability of a sand used for large castings made on jolt machines, and a better finish would result, but care was necessary if such procedure was carried out on dry sand work where a mould paint was applied.

Recommended Types of Sand

For light castings in grey iron, stove plates, etc., a natural sand would best suit the jobbing foundry. In mechanised foundries a semi-synthetic or totally synthetic mixture was advisable, using a kaolinite bond. More often than not very little core sand was used, but in the cases where the proportion of cores to moulding sand was high, a fine base sand should be used with a cereal binder for the cores. For medium castings of the automobile type, a synthetic mixture was essential for mechanised production. A

semi-synthetic mixture was preferred for the general foundry, which had good sand preparation plant available. For jolt-squeeze machines, 70 to 80 per cent. shatter value was satisfactory, and a mixture of kaolinite and montmorillonite bonds was suitable. For heavy castings for general foundry use the semi-synthetic mixture was preferred, but for green sand work using large jolt machines, a synthetic mixture with 60 to 80 per cent. permeability and controlled within 70 to 75 per cent. shatter was the better.

In malleable foundries, due to the high contraction of malleable iron, a collapsible sand mixture was essential, and for the jobbing foundry a floor sand plus a small proportion of red sand was satisfactory, but for mechanised production a synthetic or semi-synthetic mixture using a kaolinite bond was ideal.

For steel foundries, in every case a synthetic sand was the best, and for most heavy work a facing of all new sand toughly bonded should be used, but should be backed up with a flowable mixture of shatter 70 to 80 per cent., made up from the used sand. Suitable combinations of binders according to the classes of work were:—

Light castings: Bentonite as the sole bonding agent.

Medium castings: Up to 2 cwt., a kaolinite binder plus a cereal or dextrin.

Medium castings: From 2 to 10 cwt., bentonite plus dextrin.

Heavy castings: For castings of several tons, a mixture using bentonite and a cereal, to give a lower hot strength and easier collapsibility was required to be skin dried and painted with refractory. High skin hardness of the mould would thus be ensured.

As regards non-ferrous metals, light alloys and aluminium: magnesium required a synthetic sand of high permeability, but naturally bonded sand was the choice for aluminium, and very little new bond was required. Phosphor bronzes were so fluid that metal penetration was high if a synthetic sand using coarse grains were employed. Ryarsh or minimum sand was satisfactory, but a mixture of clays was necessary. Jobbing shops should use a naturally bonded sand.

In conclusion, Mr. Graham stated that his notes were intended as a rough guide, but it was essential that the foundry technician having to decide on sand mixtures should consider every possible aspect before commencing a sand control scheme. To attack the flowability question using existing sands demanded thorough examination over the whole moisture range, and all data should be correlated against practical foundry experience. He desired to thank the directors of Coneygre Foundry, Limited, for the facilities granted him in preparing the Paper, and the sand laboratory staff for their part in the testing of many mixtures of various sands and clays.

Subsequently Mr. Graham replied to a number of questions by members, and on the proposition of Mr. L. W. Bolton, seconded by Mr. J. Dixon, he was heartily thanked for his Paper.

THE CANADIAN INTERNATIONAL TRADE FAIR is to be held at the Exhibition Grounds, Toronto, from May 31 to June 12, 1948.

More Foundry Amenities

Messrs. Dawson, Payne & Elliott, Limited, the old-established firm of printers' engineers, manufacturers of "Wharfedale" and other printing machines, have provided for their 700 employees at their Atlas Foundry, Otley, Yorkshire, completely new and handsomely fitted washing facilities and other amenities. These comprise six shower baths in separate cubicles made by Gummers, of Rotherham; clothes-changing cubicles; a footbath, two drinking fountains, 12, Adams wash hand-basins with hot and cold water and heated cloakrooms where workpeople may change into overalls and leave outdoor garments in numbered cages in a drying atmosphere.

Mr. A. D. Jenkins, of the Engineering and Allied Employers' National Federation, presided on Friday at the formal opening, which was performed by Mr. H. Fenton, district organiser of the Amalgamated Union of Foundry Workers. A large attendance of foundry trade representatives included Mr. J. Watkinson, O.B.E., Deputy Regional Controller of the Ministry of Supply; Mr. G. W. Allott, president, and Mr. O. Gibson, secretary of the East and West Ridings Association of the Ironfounders' Confederation; Mr. W. G. Thornton, president, and Mr. R. Heywood, secretary, of the Bradford and District Association of the Engineering and Allied Employers' Federation; Mr. D. Powell, president, and Mr. W. Burke, secretary, of the Otley Branch of the Amalgamated Union of Foundry Workers; Mr. G. W. Ibbotson, of Newton, Chambers & Company, Sheffield; Mr. J. Craig, foundry foreman at the works; and the directors of the company.

Mr. Fenton, warmly thanking the firm for the provisions they had made for the comfort of their workpeople, said his union had tried, as an organisation, to improve conditions in foundries. They had attempted to get employers to see eye-to-eye with them concerning hygienic conditions of employment, and their aim had been to arrange that foundrymen could leave at night in the same clean state as they arrived in the morning. He paid a tribute to Messrs. Dawson, Payne & Elliott for making such provision on their own initiative without any pressure from the union, and he hoped every man would make full use of the facilities available. He would be in favour of an undertaking that such facilities should be used being made a condition of employment. In conclusion, he thanked the firm for being allowed to take an official part in the opening.

Mr. A. Hardy, a member of the National Executive of the Amalgamated Union of Foundry Workers, also expressed thanks to the firm on behalf of the workers.

A vote of thanks to Mr. Fenton was proposed by Mr. Stott, sen., a member of the firm.

With a view to inducing their workpeople to make a regular habit of attaining cleanliness before leaving the works, wives and mothers of workmen are to be invited to inspect the new arrangements.

The firm wish to announce, through the FOUNDRY TRADE JOURNAL, that anyone wishing to inspect the new arrangements will be made welcome at the works.

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London Students' Vacation Scheme

The thirteenth annual report issued by the Imperial College of Science and Technology, states that the increasing numbers of students availing themselves of the Scheme is a gratifying feature in view of the fact that it is entirely voluntary, except for metallurgical students. Registrations in 1945, 1946 and 1947 were respectively 467, 586 and 705. Such an increase (119 per year) cannot, of course, be maintained, but the fact that such a large proportion of the student population of the College is already involved, without compulsion, is some indication that the Scheme has become an accepted adjunct to the theoretical and practical training provided within the College. In the opinion of the Committee this is due in no small measure to the progressive attitude adopted by the firms that have been kind enough to provide the necessary facilities for vacation work, and to the more or less standardised scales of payment and hours of work.

A Reciprocal Arrangement

In 1946 the Committee commenced its arrangements for the International Exchange of Students on vacation work, whereby a certain number of Imperial College students were accommodated in firms abroad while an equal number from those countries facilitating the Exchange were accommodated in firms in this country. This venture, initiated by the Vacation Work Committee of this College, has evoked great interest from Governmental and other institutions both here and abroad, with the result that committees are being set up in other countries to organise this Scheme in association with the Imperial College Vacation Work Committee. In 1946 there took part in this scheme 46 students in all, home and foreign. By 1947 it had increased to 105 Imperial College outgoing students and 116 incoming students from abroad, in all 221. The firms that took part in this venture were 70 abroad and 55 British. The reports these students have brought back of the nature of their work and experience, of their treatment by the firms, and of their contact with the peoples of these countries justify the Committee in its belief in the educational value of the scheme. Two points in this connection deserve special mention. In the first place only those who have already engaged in vacation work at home are allowed to undertake such work abroad unless they are ex-Servicemen. In the second place, the students of this College have been so impressed with the hospitality they have received in other countries that they have taken special steps to arrange for the reception, hospitality and entertainment of the incoming students.

The industrial tours initiated in 1946 have also been continued in 1947 with growing success. Groups of staff and students paid visits to Holland (28) and to Sweden (29) on extended studies of industrial concerns, and so obtained a survey of the industrial structure of these countries. The Committee would like to express its gratitude for the unfailing kindness and hospitality received everywhere during these visits. It may be added that two students went to Canada and two, on oil tankers, to Persia.

Forming the Runners and Pouring

Foundry Technique, Film Strip No. 5, produced by Educational Publicity, Limited, 17, Denbigh Street, Victoria, London, S.W.1.

"Forming the Runners and Pouring," is the latest addition to the series of visual training films. In a logical sequence of thirty-one frames, with an explanatory 12-page booklet of notes, the film gives a complete survey of the methods for arranging the mould to receive its molten metal and then for the actual transport of the molten metal from the melting furnace and its delivery into the mould cavity.

The reviewer, as one who has in the past been engaged in teaching foundry practice, has nothing but admiration for the previous film strips, and this new one well maintains his appreciation. On these subjects now covered, there is, at present, no generally accepted code of good practice, and yet this film strip of itself might be taken as such. It avoids much detail, which can be added by the lecturer, but adequately covers essential points and gives considered reasons for the steps taken. Fancy methods, though they may be well tested, are not dealt with, it doubtless being considered they would confuse the issue. Likewise, minor points of criticism which occur to the reviewer, such as the need for the making of small runner bushes on a board and not on the mould proper, might be dismissed as *tours de main* differing from foundry to foundry and not always generally applicable. In the case of pouring, the propagation of the idea that ungeared ladles should be limited to 10 cwts. capacity is a pointer to industry. That an even lower limit might be set in no way decries the merit of the original stipulation in the light of present practice.

The notes in the film commentary are positive, for they begin in the imperative mood with "Do, so and so" and follow with the reason for so doing. "Don'ts" are few, but where they are quoted they are duly substantiated by the why's and wherefore's.

Such aids to training as these are recommended to all enlightened foundry practice instructors; with them, drawings on the blackboard are superfluous and the time that was spent in sketching can be put to better use.

National Conference on Industrial Safety

The Industrial Safety Section of this year's National Safety Congress will take the form of a residential conference at the Royal Hotel, Scarborough, from June 10 to 13. Speakers on the opening night will include Lord Llewellin, the President of the Society, Mr. G. P. Barnett, H.M. Chief Inspector of Factories, and Mr. Ian Mikardo, M.P. At later sessions, experts from industry will speak on such technical subjects as the maintenance of chains and lifting tackle, handling of materials, chemical hazards in non-chemical works, the training and qualifications of safety officers, and the use of discussion groups as an aid to accident prevention. The conference is open to all, whether members of the Society or not. Detailed particulars can be obtained from the Society's Industrial Safety Division at 131, Sloane Street, London, S.W.1.

Recent Technical Developments in the Production of Iron Castings*

By E. C. Dickinson, M.Met., F.I.M., A.M.I.Mech.E.†

(*Continued from page* 344.)

Di-electric Core Drying

A core weighing, say, 10 lb. can be dried in about 3 min., compared with 60 to 90 min. using conventional conveyor-type core stoves. With the high speed of drying and consequent high throughput attainable in an electronic oven, there is a great reduction in the floor space necessary for drying a given quantity of cores; another advantage is that, in the event of a core being urgently required, it can be supplied to the foundry in a very short period of time. In the Morris foundry, the normal cycle for coremaking, conveying to the store, drying, examination, blacking, re-drying where necessary, and delivery by pendulum conveyor to the mould assemblers, is at least 3½ hrs. This time can be cut down in an emergency to about 2 hrs. To cover shortages which can arise from absenteeism, it is desirable to have 3 to 4 hrs.' stock of all cores at the mould assembly stations, and while this insurance against production stoppages cannot be dispensed with, the volume of core storage could no doubt be reduced if it were known that shortages could be made good in a much shorter time than is now normal.

The bond used for most of the experimental work in core drying by di-electric loss heating has been urea formaldehyde, principally because it sets at a relatively low temperature with a "trigger action," which means that, once the correct temperature has been reached, further time need not be allowed for setting to take place. Bonds which set by chemical action, such as oxidation, introduce a time factor, and since the required temperature can be reached in about 3 min. by this electrical method, quick setting has been considered essential to success. Apart from the advantage of these properties, sand bonded with urea formaldehyde works well in the core shop; it has a reasonably low gas content when dried, and used cores strip from the casting extremely well, leaving a good metal surface.

On the other hand, this bond is liable to break down in very frail cores before the surrounding metal has completely solidified. Another disadvantage is that, in drying pasted cores with the gas torch, a disagreeable odour is given off, and it may therefore be desirable to use some other method of sub-assembling cores. The fumes or smoke given off on casting are non-toxic and generally regarded as reasonably inoffensive, although they are not pleasant.

Application to Normal Bonding Materials

The bond used for cores dried in normal ovens at the Morris foundry is largely molasses, with a small percentage of linseed oil. This has by no means a trigger action, since it relies both on loss of moisture and oxidation to produce the required strength, and the drying temperature employed at that foundry is very high, namely, 550 to 600 deg. F. (280 to 315 deg. C.).

It was decided to attempt to bake cores made with this bond by the high-frequency method, and it was found that by suitable adjustments of electrical conditions and time, the requisite temperature could be achieved and satisfactory cores could be made by this method and using this bond. If molasses-linseed base core sand is not baked at a sufficiently high temperature for a sufficient length of time, there is, under normal conditions, a danger of the core being hygroscopic and its softening during lengthy storage, but heating for 3½ min. by high-frequency current gave cores which were free from this trouble, and evidently the setting reactions can be completed in this reduced time.

There is a very wide variety of core bonds between urea formaldehyde with its low temperature trigger action setting, and the molasses-linseed type of bond. In this range there are other plastic types of bond, several cereal binders, and some of these may well prove ideal for di-electric loss methods of heating, but research work is necessary to determine the best electrical and time conditions for each bond.

Effect of Core Wires and Drying Shells

The presence of wire used to reinforce the cores may naturally be expected to affect the distribution of the electrical field and so interfere with the heating. In some experiments it has been found that wires which are parallel to the electrodes have very little effect. In other experiments in which the wires were vertical to the electrodes, successful drying of the cores was achieved provided the ends of the wires were not too near to the surface. (See Fig. 4.)

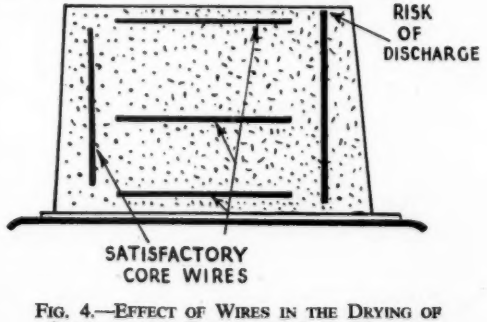

FIG. 4.—EFFECT OF WIRES IN THE DRYING OF CORES BY THE DI-ELECTRIC LOSS METHOD.

* A paper read before the Lincoln Section of East Midlands Branch of the Institute of British Foundrymen, Mr. E. A. Phillips presiding.

† General Foundries Manager, Morris Motors, Ltd., Engines Branch

Recent Technical Developments

The speed of drying reduces the need for support while the core is in the green condition, and it may be found possible to eliminate core wires and metal supporting dryers in some instances. Many cores, however, are, of such a shape that dryers are essential, and this again introduces a factor which requires consideration. It has been found that where cores are in contact with an electrode, which remains comparatively cold during the baking operation, the sand remains cold and complete hardening does not take place in this region. This can be overcome by interposing a layer of non-conducting material such as asbestos board. The same difficulty can be anticipated when using a metal dryer, but it is considered that the trouble might be overcome by using ceramic dryers or by spraying the metal dryer with a non-conductor of heat in suitable form.

Another effect of the cold electrodes is that moisture driven off from the drying sand may condense on the upper electrode. The drops formed may lead to local electrical discharges. This can be obviated by causing a current of warm air to pass over the core in order to remove the moisture. When the apparatus is in

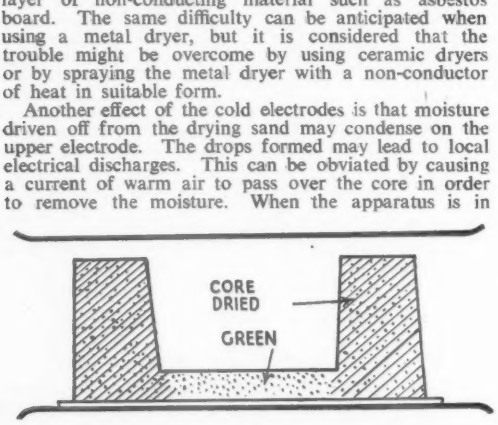

FIG. 5.—HOW IRREGULAR SHAPE CAUSES DIFFICULTY IN DI-ELECTRIC CORE-DRYING.

continuous use, and fed by a conveyor belt, the succession of hot cores will gradually heat the electrodes by normal heat transfer so that condensation may only be experienced during the commencement of operations.

The process is readily applicable to flat cores, that is where the upper surface is parallel to the base, but difficulty may be anticipated with cores in which the upper surface is irregular. Fig. 5 illustrates how shallow parts of the core may remain green. It is understood that this is not a serious difficulty with quick setting low-temperature bonds, but the trouble was experienced with the molasses-linseed mixture.

A vital question which will come to mind is whether the di-electric loss heating method of core drying is economically satisfactory. This is a problem which each foundry must consider in the light of its own conditions and first hand information. It depends on the choice of bond, the comparison of heating costs, plant depreciation, conservation of floor space occupied by the plant and core storage, the hidden value of the rapid supplying of cores to meet assembly shortages, and many other factors.

Conclusions

It is impossible to attempt in this Paper to make a comprehensive survey of the subject. The time available has made it necessary to exclude many technical developments of value and interest to the foundry industry.

It is hoped that these brief notes have stimulated the interest of those responsible for the technical side of the industry. As an important part of British industry upon which the very life of the country depends to-day, ironfoundries must keep abreast of the times if foundrymen are to give the other industries with which they are connected, castings in sufficient quantity and of the quality required to meet their demands. Shortage of manpower and restrictions on building expansion intensify the need for using every known technical device for improving methods of manufacture.

British scientists have always been in the forefront of discovery, and that position is being maintained to-day. It is up to the ironfoundry industry to take advantage of the flood of new knowledge if it is to maintain its own position in world trade.

Acknowledgments

The Author wishes to record his thanks to Morris Motors Limited for permission being granted to publish this Paper, and to refer to experimental work carried out at, or in connection with, their Coventry Foundry.

The British Cast Iron Research Association has kindly permitted the Author to include information about the cupola melts of Nodulite carried out at the above foundry as Association field tests.

Much of the experimental work in di-electric loss heating was done at the Research Laboratories of the General Electric Company, Limited, and Dunlop, Limited, and permission to publish information gained is gratefully acknowledged.

A New Publication

Henry Wiggin & Company, Limited, Grosvenor House, Park Lane, London, W.1, have recently published the first issue of a new monthly house organ, "Wiggin Nickel Alloys." Before the war this firm issued a monthly periodical entitled "Monel Notes," which described the properties and uses of Monel, then one of the most important of their products, in addition to periodical references to nickel, Inconel and other products having similar uses. The war brought important additions to the range of alloys which they manufacture. The Nimonic series, for instance, introduced to meet a special and urgent need for war purposes, assumes in peacetime industry a bigger and more versatile rôle even than that which has brought it into such prominence in the war years. Electrical and temperature control alloys have also been developed far beyond their pre-war range.

This publication is available to any readers who write to the publicity manager at the Park Lane address.

I.B.F Scottish Branch Annual Meeting

The Annual Business Meeting of the Scottish Branch of the Institute of British Foundrymen was held in the Royal Technical College, Glasgow, on March 13, when the Branch President, Mr. R. O. Patterson, presided over a large gathering of members and friends. He was accompanied to the platform by Mr. P. H. Wilson, President of the Institute, Mr. T. Makemson, General Secretary, and Mr. R. C. Shepherd, Lincoln.

Mr. John Bell, Hon. Branch Secretary, submitted the Secretarial Report for the session, and the Financial Statement at the end of the year. After adoption of the reports the Branch President formally welcomed Mr. Wilson, Mr. Makemson, and Mr. Shepherd, and called on the President to present the prizes to the winners of the "John Surtees Memorial" Competitions. In an introductory note to this part of the proceedings, Mr. Patterson said that these competitions had been held in Scotland every second year since they began in 1924. This was, therefore, the 13th competition, and throughout the whole series Mr. A. Campion had acted as Examiner, although, on this occasion, he had Mr. Alexander Marshall, Past President of the Branch, as Associate Examiner.

Presentation of Prizes

The winners were:—

Senior:—(1st) Gold Medal and Prize: Mr. John B. Morton, Thornliebank, and (2nd) Mr. John Steele, South Africa.

Junior:—(1st) Silver Medal and Prize: Mr. Alexander Marshall, Motherwell, and (2nd) Mr. William Hunter, Wishaw.

It was noteworthy, continued Mr. Patterson, that both winners in the senior section were young foundrymen who had served their apprenticeship with the Clyde Alloy Steel Company, Limited, Motherwell, and that the winners in the junior section were both apprentices with the same firm. It was also remarkable that Mr. Morton, now employed by the Argus Foundry, Limited, was the seventh person to win a "Surtees" Gold Medal while employed by that firm, while the foundry manager at Argus, Mr. James G. Arnott—formerly Manager at Clyde Alloy Steel Company—and the present manager at Clyde Alloy Steel Company, Mr. Robert Macnab, had both won a "Surtees" Gold Medal while employed at Argus.

In presenting the medals and prizes, Mr. Wilson congratulated the winners, and encouraged them to continue their efforts towards technical advancement.

Mr. Tom Shanks, Past President of the Branch, intimated that during the session a competition on "Making the Foundry More Attractive" had been held. Several papers had been received, and a panel of five examiners had finally, though with much difficulty, placed the first three as:—

1st, Mr. J. G. Nisbet, Glasgow, and joint second, Mr. James Meek, Kirkintilloch, and Mr. Walter Graham, Wishaw.

He intimated that it was intended to prepare a paper based on the opinions expressed by the competitors, and it was hoped to present this paper at a future meeting of the Branch. The competition had been made possible by the generosity of an ironfounder in the Falkirk area, who, although not a member of the Institute, had, as an appreciation of the work done by the Scottish Branch, kindly given a sum of money to be used as the Branch Council might determine. The prizes were then presented to the winners.

Election of Officers

The office-bearers were elected for session 1948-49 as under:—

As *President*, Mr. W. Y. Buchanan. As *Sen. Vice-President*, Mr. R. S. M. Jeffrey, B.Sc., F.R.I.C. As *Jun. Vice-President*, Mr. James G. Arnott. As *Members of Council*, Mr. A. Black, Mr. John Cameron, Jr., Mr. J. E. O. Little. As *Representatives to General Council*, Mr. John Cameron, Jr., Mr. Alexander Marshall, Mr. Tom Shanks, Mr. R. R. Taylor. As *Representative to Technical Committee*, Mr. Evan J. R. Mitchell. As *Hon. Secretary*, Mr. John Bell.

After the completion of the business, Mr. Wilson and Mr. Makemson addressed the meeting, congratulated the members on the successful year under review, and thanked the office-bearers for the efforts they had put into the work of the Branch.

Mr. Shepherd's paper on "production flow" followed, and a most interesting discussion developed, which kept the meeting in session for a much longer period than normal.

Branch Dinner

In the evening, the Branch Dinner was held in the Grosvenor Restaurant, Glasgow. Mr. Paterson presided, and at the high table there were also the Rt. Hon. the Lord Provost of Glasgow, Sir Hector McNeill; Mr. P. H. Wilson, O.B.E., and Mr. Tom Makemson, M.B.E., President and Secretary of the Institute; Mr. R. C. Shepherd, Lincoln; Mr. C. A. Oakley, Scottish Regional Controller, The Board of Trade; Mr I. M. Lyon, Babcock & Wilcox, Renfrew; Mr. W. Y. Buchanan, Senior Vice-President of the Branch, and Mr. R. S. M. Jeffrey, Junior Vice-President.

The toast of the City and Corporation of Glasgow was proposed by Mr. Lyon, and responded to by the Lord Provost. "The Institute" was proposed by Mr. Oakley and acknowledged by Mr. Wilson, while the "Scottish Branch" was proposed by Mr. Shepherd and responded to by Mr. R. O. Patterson.

During the evening, the Chairman referred to the 21 years' service of Mr. Makemson as General Secretary of the Institute. In offering a special welcome to Mr. Makemson, Mr. Patterson congratulated him on the work he had done for the Institute and, during the war, for the country while serving as Director of Iron Castings. Mr. Makemson acknowledged this welcome, and thanked Mr. Patterson for the opportunity of joining with the Scottish Branch on this occasion. The proceedings terminated in traditional Scottish manner by the singing of "Auld Lang Syne."

Notes from the London Sections

Slough Section

There was good attendance at the Annual General Meeting of the Slough Section of the London Branch of the Institute of British Foundrymen held in the Lecture Hall of High Duty Alloys Limited; Mr. S. B. Michael was in the chair. In the business part of the meeting the following were elected as officers for the 1948-49 session:—As *President*, Mr. F. C. Evans; as *Senior Vice-president*, Mr. R. B. Templeton; *Junior Vice-president*, Mr. R. Blandy; *Members of Council*, Mr. A. Logan, Mr. I. Ross, Mr. S. B. Michael, Mr. E. J. Pike, Mr. F. McKenning, Mr. H. Turner, and Mr. A. Burgess. The Honorary Secretary, Mr. E. Raybould, consented to serve for a further term of office.

After the business of the evening two of the five sections of the film "Atomic Physics" were shown. The first traced the history and the last the present-day position. Although this subject was something out of the usual run for foundrymen's meetings, the interest of the members was evident. It was generally felt that now this age is sometimes referred to as the "Atomic Age" it was nice to know something definite about atomic physics.

At the conclusion of the meeting thanks were expressed to the officers of the current session, and the newly-elected officers were introduced. Tribute was warmly accorded to the directorate of High Duty Alloys Limited for the continued use of the lecture room and its facilities.

East Anglian Section

At a meeting held in the Lecture Hall, Central Library, Ipswich, in March, Mr. R. F. Coates presiding, a Paper was read on "Some Interesting Developments in Foundry Production," by Mr. A. J. Richman, of Ransomes, Sims & Jefferies, Limited. The theme of Mr. Richman's talk was "necessity is the mother of invention." Many ingenious examples of methods adopted to meet the demand for increased production were illustrated by slides, sketches, and exhibits of cores and castings. Developments which had increased speed and quality of production of ploughshares and other castings for the agricultural industry were of particular consequence. An interesting discussion followed the address and the inspection of the exhibits. Mr. J. King proposed a vote of thanks to Mr. Richman for his interesting address; this was seconded by Mr. V. Child and carried with acclamation. Mr. Richman suitably responded.

Gaseous Annealing of Malleable

By means of a scale model, to be installed at the Birmingham section of the British Industries Fair, Birlec, Limited, of Tyburn Road, Erdington, Birmingham, will demonstrate the characteristics of a gaseous malleable annealing process. It has long been recognised that the present method of annealing malleable castings by packing them in iron ore in heavy cans is rather out of harmony with present-day efficiency. The Birlec gaseous annealing process for whiteheart malleable castings makes it possible to eliminate entirely both cans and iron ore and to reduce the annealing cycle to a matter of 48 hours or so, instead of five days or more, as in the case of the conventional process. Over-all annealing costs are reduced to a fraction of those of the older method and working conditions are considerably improved. The establishment of gaseous annealing in the whiteheart malleable industry is now an accomplished fact and the practical success of the process described has been amply proved. There seems little doubt that it will tend to replace the conventional pack-annealing method and become a standard process in the industry in the course of the next few years. Fig. 1 shows an installation of the elevator-type furnace in operation on a production basis.

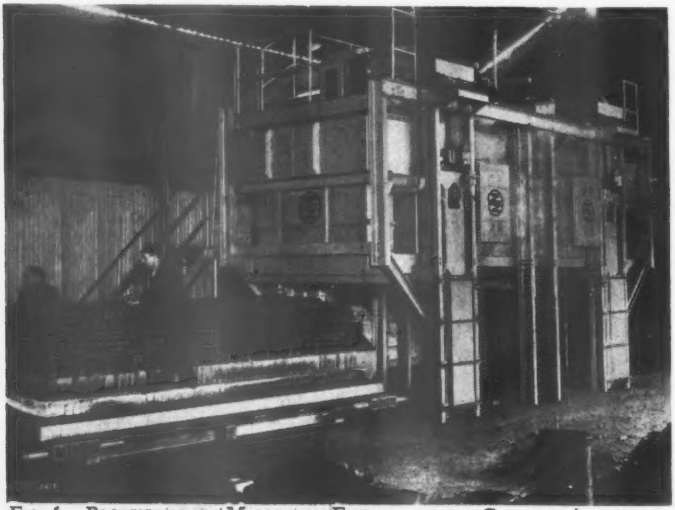

FIG. 1.—PRODUCTION OF MALLEABLE FITTINGS BY THE GASEOUS ANNEALING PROCESS.

Aluminium Casting Design Factors*

Requirements for Sand Castings, Gravity and Pressure Die Castings

Section Thickness

In many respects the design of a casting for aluminium alloys is similar to that required for other metals. Special consideration, however, must be given to certain factors if best results are to be obtained. Wherever possible, section thickness should be uniform throughout, especially in die castings. If sections of different thicknesses cannot be avoided, the thickness should be increased gradually, or blended, where sections of different thicknesses adjoin. Sections should have a minimum thickness of $\frac{1}{8}$ in. for sand and gravity die castings, although $\frac{1}{16}$ in. or thicker sections are required for most castings. Under special conditions, castings having sections thinner than $\frac{1}{8}$ in. can be produced in dies. Pressure die castings having a major dimension of 6 in. can be produced with sections as thin as 0.045 in.; larger die castings will require somewhat thicker sections, but thicknesses in excess of 0.15 in. seldom are required by the casting process alone.

Large flat areas should be avoided, as they involve casting difficulties; slightly curved design usually can be substituted. Where added strength is needed, sections may be stiffened by reinforcing ribs which in general should be about $1\frac{1}{2}$ times as thick as the supporting sections. Ribs should have flat rather than rounded edges, to avoid overstressing the outer layers. Beads should be added to the outer edges of ribs wherever this can be done without undue complications. Generous fillets should be provided between ribs and their supporting sections as well as between adjoining sections themselves.

Locating points for the guidance of the machine shop in machining the casting should be so specified with respect to the outside walls of the casting that they will not be affected by core movement. They should be clearly indicated on the drawings. Special care is required in specifying locating points for castings to be made in dies; it is advisable to consult with an experienced die caster in this matter.

Draft and Shrinkage

Both draft and shrinkage must be taken into account in the design. In sand casting, sufficient draft, or taper, must be provided on all vertical faces to permit the pattern to be drawn from the mould. At least $\frac{1}{16}$ in. per ft. (0.5 per cent.) must be allowed, and the drawings should indicate whether this is to be added to or subtracted from the dimensions shown.

In permanent moulds, also, sufficient draft must be provided on the vertical surfaces to permit the casting to be removed from the mould. This will vary, depending on the orientation of the particular face with respect to the body of the casting. Because the metal has a tendency to shrink away from the outer surfaces of the mould cavity and to shrink tightly around the inner surfaces, more draft is required on the inner than on the outer surfaces. On outer surfaces the draft angle can vary from 1 to 3 deg.; on inner surfaces it should be 2 deg. minimum, 5 deg. desirable.

As in gravity die casting, parts designed for pressure die casting must have sufficient draft to enable the castings to be removed from the dies, and the cores must have sufficient draft to permit them to be drawn from the castings. For round holes up to $\frac{1}{8}$ in. in dia., the required draft is 0.020 in. per in. of depth; $\frac{1}{8}$-in. to $\frac{1}{4}$-in. holes, 0.016 in.; and $\frac{1}{4}$-in. to 1-in. holes, 0.012 in. For larger openings, 0.012 per in. of depth should be allowed for the first inch of diameter, plus 0.002 in. for each additional inch. On surfaces in square, rectangular or irregular holes, the draft may be the same as for circular holes having diameter equal to the distances between opposite surfaces. Where draft is necessary on outside surfaces, it should be about half that required on inside surfaces. On surfaces against which shrinkage takes place, the draft should be the same as on inside surfaces.

To compensate for the linear shrinkage resulting from the contraction of the molten metal upon solidification and cooling to room temperature, the pattern must be larger than the desired casting. This allowance may vary from 1/10 to $\frac{5}{32}$ in. per linear ft., depending on variations in casting design, alloy, and resistance to contraction offered by the mould and cores. Less shrinkage allowance is required with permanent mould and die casting than with sand casting.

Machining Allowances

Machining allowance necessary on different parts of a casting will vary, depending on the casting process, size of the casting, method of machining, and type of finish. For sand casting, simply rapping the pattern during the moulding operation will often provide sufficient allowance where only grinding or filing is required. For small and medium-size castings to be finished in a lathe, planer, or milling machine, $\frac{1}{8}$ in. usually is sufficient; $\frac{1}{4}$ in. or more is required on large castings. Less allowance is required in gravity die castings because of the smoother finish and greater uniformity of dimensions; allowances of $\frac{1}{32}$ in. to $\frac{1}{16}$ in. are adequate for small and medium-size castings, and up to $\frac{1}{8}$ in. for large castings.

Machining allowances on pressure die castings will depend on the use for which the castings are intended. For many purposes the smooth surfaces produced on castings made by this method are satisfactory without any finishing operations beyond removing the fins which usually are formed at parting lines. In other cases, polishing operations are required and allowances approaching those specified for gravity die castings may be necessary. Machining of pressure die castings

*Extracted from "Materials and Methods."

Aluminium Casting Design Factors

should be kept to a minimum, as too much machining may remove the tough, dense, surface layer which is characteristic of castings produced by this process. Therefore, machining allowances in die-cast designs should be reduced to a minimum.

For all types of castings the design should permit mould parting lines to be straight wherever possible, as uneven parting lines usually will result in higher production costs. Deep pockets and small recesses should be avoided in order to simplify the design of the required cores. Undercuts are troublesome and should also be avoided whenever possible.

Design of Cores

It is highly advantageous to design parts for sand casting so that any necessary cores are formed as part of the mould. When seperate cores are required, they should be kept as simple as possible. Long thin cores should be avoided wherever possible, because of the danger of breakage. A design requiring two-piece or multiple cores resulting in fins also should be avoided, especially if the fins cannot be removed.

Core prints in designs for sand and semi-permanent mould casting must be large enough to allow the escape of gases developed during the pouring operation and to permit removal of any chills or strengthening wires used in the cores. In castings that must be pressure tight, additional core prints beyond those normally required for core support may be necessary for the escape of mould gases. Any openings in casting walls made by core prints that are not required for functional purposes may be closed by a threaded plug, a welded or bolted plate, or other means. Where core prints are necessary in highly stressed sections, a bead around the hold will compensate for the loss of section.

In gravity die casting, the metal cores are withdrawn from outside the mould before the casting is removed. Complicated parts may require the use of sand cores (semi-permanent mould method) or split cores and multiple-piece moulds. These are more expensive and require more production time than simple cores and two-piece moulds, and often design changes can be made to simplify both the mould design and the coring. Interlocking metal cores should never be used in permanent mould casting.

Cores should be specified wherever possible in die casting designs, as their use will promote structural soundness, ensure uniform section thickness, and save metal. As in the other methods of casting, the simpler the cores can be the better. The simplest designs will require only cores that are parallel to the direction of the die motion; such cores may be permanently fixed in either half of the die. Long cores should be avoided unless they can be piloted into the opposite section of the die. Cores that are not parallel to the direction of motion of the die and interlocking cores introduce complications and therefore should be avoided so far as the design will permit.

Metal Inserts

Hard metal inserts often are used in aluminium castings at points subject to excessive wear or stress. These are usually cast iron or steel, but copper or brass may be used if properly protected to prevent their solution in the molten aluminium. Keyed inserts sometimes are used where high torque must be transmitted to a rotating aluminium part. Sufficient metal must be provided around inserts to prevent cracks from contraction stresses during solidification. Inserts should be knurled, grooved, or keyed so as to provide good mechanical retention under service conditions. Large inserts may be slotted where contraction stresses must be kept to a minimum.

The heating elements of electric irons and hotplates are often cast in place, providing better heat distribution and faster heating than could be obtained with separate heating elements. Small-diameter copper tubing also can be cast into the walls of aluminium castings, to provide passages (for oil or other fluids) which could not be cast or machined because of their small diameter or curved direction.

LAST THURSDAY, BRADLEY & FOSTER, LIMITED, of Darlaston, celebrated the 25th anniversary of their reconstruction at a function held at Bilston Town Hall. Mr. D. N. Turner, chairman of Staveley Coal & Iron Company, presided. Mr. T. A. McKenna, chairman of Bradley and Foster, announced that each of the 500 employers were to receive a bonus of a week's pay. Dr. J. E. Hurst, on behalf of the staff, presented Mr. G. T. Lunt, the managing director, with an antique silver candelabra in recognition of his services to the company. A cheque for £50 was presented to Mr. J. Whitehouse on his retirement, and war savings certificates were given to nine of the staff having 25 or more years' service.

THE EDGAR ALLEN RESEARCH DEPARTMENT have recently examined an old padlock found near Newbury in Berkshire, about a quarter of a mile from a Roman site where various Roman remains have come to light. The non-destructive method of spectrographic analysis was used, and indicated that the main body of the lock was of iron, not of meteoric origin, coated with brass, and containing a small amount of lead. The lock has stood up remarkably well to the corrosion of possibly 1,500 years, as in all probability it was made in Roman times.

THIRTY-SIX MEN, who between them have served over 1,200 years with the same firm, were recently presented with badges and certificates at a dinner given in their honour by the directors of William Whitehouse & Company, Limited, brassfounders, of Brueton Street, Birmingham.

THE INSTITUTION OF PRODUCTION ENGINEERS is holding a National Convention at Bournemouth on September 23, 24 and 25, 1948, the preliminary arrangements for which have already been completed. Both members and their ladies are invited to this function.

A Problem in Running

By "Tramp"

How best to run a job is a question that continuously crops up in jobbing work. Unlike production jobs which are moulded in special boxes, jobbing work is more often than not made in box parts that are not ideal, consequently the runner can not always be placed where desired.

A method whereby a double box casting, Fig. 1, was successfully produced in a box with only 1½ inches of sand joint all around the pattern, was to run direct on to the central web or rib. As this casting was produced in green-sand, this method was considered to be accompanied with some degree of risk, as the continual flow of the metal might cause excessive erosion of the sand and thus increase the probability of wasters. A core was necessary to form the foot portions A, B, Fig. 1, and it was decided to

(*Concluded at foot of column* 2.)

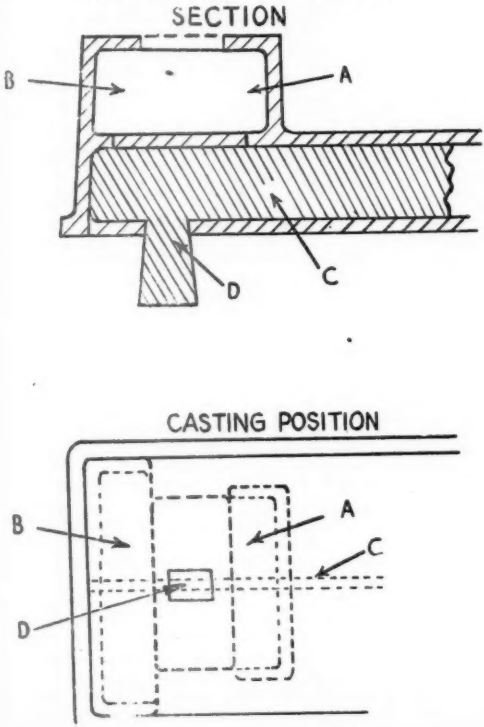

FIG. 1.—METHOD OF RUNNING BOX-TYPE CASTING ON THE CENTRAL WEB.

A Note on Risers

By "Coroner"

Risers are of two main types; the first are used on grey-iron castings and are employed to indicate when the mould is full and to relieve the strain on the mould, and the second type are used on steel and high-duty iron to feed the solidifying casting with liquid metal to compensate for the liquid shrinkage and solidification shrinkage.

The first type of riser, of small diameter, is easily removed from the casting by means of a sharp blow, but care must be exercised if it is situated on any part liable to fracture. Such risers are best knocked off before the sand is removed from around the adjacent metal sections. Risers of the second type are more difficult to remove owing to their bulk. Often they may be knocked off after a preliminary notch has been made by means of a chisel, but occasionally they require a number of holes to be drilled through the neck portion, so as to weaken it, and thus enable it to be broken off easily.

A method whereby adequate feeding may be obtained from risers of the type which can easily be removed, is by the insertion of a core containing a number of small holes, between the casting and the neck of the riser. Such a core, being comparatively thin, absorbs and retains considerable heat around the neck of the riser and thus allows the riser metal to feed the casting. On solidifying, the riser is attached to the casting by a number of small cylinders only and is therefore easily removed.

Recently a number of wasters were encountered on which this type of riser has been employed. Other castings had been previously produced successfully by this method, but these particular ones exhibited a depression on the face as if caused by gas. Investigation revealed that the core-maker who previously made these cores in a natural sand had substituted an oil-sand mixture and then, before sending the cores to the moulder, had sprayed them with a coating of oil, his idea being to harden the surface to prevent burning-in.

Unfortunately, the use of oil sand initially, and the extra spraying afterwards, provided material that, on casting, evolved considerable quantities of gas which was then trapped in the casting. This experience is recorded to warn potential users of the method to avoid using a material for these cores which will evolve excessive gas on casting, as the trouble saved in removing the riser may be more than offset by the scrapping of the casting.

(*Continued from column* 1.)

let the metal fall on to the top of this core. A long thin wedge runner was placed on the web C at D, the casting position being upside down. This is a good example of the use of oil-sand cores to withstand erosion, and the method which can be adopted in jobbing work when greensand forms the major part of the mould.

Book Reviews

Free Expression in Industry, by J. J. Gillespie. Published by the Pilot Press, Limited, 45, Great Russell Street, London, W.C.1. Price 10s. 6d.

The Author criticises industry for inhibiting the "free" development of the individual worker in work and pleasure. He deduces with the aid of a wearisome plethora of quotations, not a few irrelevant to his main thesis, that the control of industry is in the wrong hands; that financial interests impose "institutional management" on the worker group, in short, that the worker is being exploited right and left.

The Author's solution to the problem, if a problem such as he outlines exists, seems to the reviewer to follow along the now familiar lines of, kick out the existing management and let the workers run industry. In case they repeat the "errors" of existing management he would set up a new democracy, what he calls an active democracy, which appears to differ from the Marxist structure in name only.

He is very keen on "Shared Responsibility" both in the industrial and political sphere as the new incentive. However, if the Author had spent less time looking up obscure and would-be psychiatrists and more time observing the practice of "shared responsibility" during the past two and a half years on the political level, he would not be so naïve.

In his preface the Author claims he is the "working man"; it is the reviewer's hope that his thinking is not that of the working man otherwise there is likely to be even less production in the future.

W. F. S.

Steel Files, their Manufacture and Application. By Eric N. Simons. Published by Sir Isaac Pitman & Sons, Limited, Parker Street, Kingsway, London, W.C.2. Price 15s. net.

The reviewer thought he had a good working knowledge of the file trade before he read this book. Now he is a little surer of his ground. He has long been under the impression that one could send worn files back to the makers for re-cutting, but now it appears the files are lighter and not worth the trouble to be associated with despatch and return. The foundry industry is, in a way, quite a large user of files, for every fettling shop must have a supply, whilst even the moulders use files "of sorts" for trimming recalcitrant cores. The historical section is particularly interesting; that devoted to manufacturing is depressing, while the "types and cuts" chapter is commercially useful. The section on the use of files should be read by every fettler, as normally he is not apprenticed to the trade and fails to realise the true worth of the tools he uses. This chapter the reviewer deems to be the best. The "art of filing" (Chapter VI) is of more interest to the mechanic than the fettler, as the work of the latter is but of a rough type. The two chapters on the testing of files and file efficiency give the reader the assurance that something has been done and much is capable of accomplishment to place the business of file making on to a proper manufacturing basis. It is well that these two chapters should have been incorporated, for the indictment set out in the last chapter (XI) necessitates for its annulment much research and the application of the now well-understood principles of manufacturing. The trouble is, at the moment, there are too many makers of files using obsolescent methods and they are unable to withstand the competition of the mass-produced articles emanating from the U.S.A. The reviewer strongly recommends this book to his readers from the dual aspect of learning much about a tool much used in the foundry industry and from the lesson preached on parochialism and obsolescence.

V. C. F.

Publication Received

Pressure Die Casting in Aluminium, Magnesium and Zinc. Published by The Birmingham Aluminium Casting (1903) Company, Limited, Birmid Works, Dartmouth Road, Smethwick, Birmingham. Price 7s. 6d.

The function of this 64-page booklet is to demonstrate not only the technical and commercial advantages of the pressure die-casting process, but also to indicate the limitations and pitfalls that can be avoided by observance of certain simple rules, and by early consultation between the designer and foundry technician.

The publication makes no pretence of being a textbook on production methods, but aims to provide practical information to users, or potential users, and to help those executives who decide the design, production and purchasing policies of a wide range of manufactures. It contains a description of the three main pressure die-casting systems illustrated with diagrams, showing how each method has its own peculiar advantages. A chapter is devoted to the choice of alloys for any particular project, with sub-sections relating to such subjects as permanence, surface finishes, effects of temperature and mechanical strength and consistency.

Economic considerations is a chapter that will be of particular interest to those who have not hitherto given serious thought to pressure die casting in relation to their own manufactures. There are two appendices, the first of which gives the composition of alloys and their mechanical properties, together with details of tolerances and tapers, minimum sizes of cored holes, etc. The second is a fully illustrated section of 19 pages showing typical examples of routine pressure die castings as supplied to a variety of industries.

THE BRITISH STANDARDS INSTITUTION has recently published Parts 3 and 4 of B.S.1121, Methods for the Analysis of Steel. Part 3 specifies the method for the determination of tungsten in steels not containing columbium (niobium) and tantalum, and Part 4 specifies the method for the determination of aluminium in permanent-magnet alloys. The solutions required test procedure and method of calculation are specified for each method. Copies of these standards can be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1, at a cost of 1s. post free.

The Emergency Laws (Miscellaneous Provisions) Act, 1947

By F. J. Tebbutt

The Emergency Laws (Miscellaneous Provisions) Act, 1947, continues some Acts and Regulations due to expire, discontinues others, and at the same times makes permanent a number of other Regulations.

Amongst the Acts extended is the "Restoration of Pre-war Trade Practices Act, 1942," which was due to expire at the end of 1947; it is now to remain in force until December 31, 1948. This measure requires an employer to restore any trade practice operative before the war (which has been departed from since) within two months of the end of the war, this limit being considered by the 1946 Act, as December 31, 1947, but the 1942 Act now stands (by this 1947 Act) until December 31, 1948. The position, therefore, is that any wartime trade practice, such as, for example, relating to daily hours, working week, whether five or six days, and so forth, overtime, boys, girls or women for certain jobs or as substitutes for men, dilution matters, definition of operations as skilled or semi-skilled, processes followed to be according to age and experience, apprenticeship matters, *etc.*, can be continued throughout 1948.

Continued similarly are some parts of the Patents and Designs Act (1942), being those which give power to Government departments to purchase and import articles and goods, the power being "to make, use, exercise, or vend" goods.

A large number of Defence Regulations are continued until December 10, 1950, many of little trade interest, but the Regulation covering Identity Cards is retained, as is that which gives power to Post Office officers to require production of these, mostly in connection with Savings Bank business.

Up to 1950, also, is continued that important Regulation which allows Orders to be made substituting shorter permitted hours of opening for shops than under the chief Acts. Various Regulations concerning patents, designs and trade marks are also retained until 1950, these including those giving discretionary powers to the Comptroller to depart from rigid interpretation of certain limits of time for doing things (a big point is time limits in Patents law) in relation to applications and so on; certain information need not be advertised or published; reference to an examination of a provisional specification (*e.g.*, to see if the invention has been used previously) is not required (this only applying when the complete specification is sent), and certain kindred matters are also continued until 1950.

Pertinent Points

Of the enactments made permanent, practically none has trade interest, and those discontinued by December 31, 1947, were mostly concerning matters which had become inappropriate since the war ended.

A point of substance is that any Regulations or enactments continued by this Act can be further extended by

(*Concluded at foot of column* 2.)

Correspondence

[*We accept no responsibility for the statements made or the opinions expressed by our correspondents.*]

LENGTHENING A GUNMETAL SPINDLE

To the Editor of THE FOUNDRY TRADE JOURNAL

SIR,—Having read with interest both articles on this subject, I cannot help agreeing with J. T. that burning-on in this case is superfluous. But I fail to see how a core, 20 ins. long by 1 in. dia. made by an extrusion machine makes a very good pattern. From J. T.'s sketch, I should imagine that a successful draw out with a core of that length and diameter would be rather doubtful. Surely the obvious pattern, and I may venture to say, one easily obtainable amongst the assortment of things found in or near a foundry, would be a piece of pipe or tube, slightly larger in diameter than the machined spindle, so as to allow for machining. The flange on the end could be moulded in several ways, such as that of using a sand core, or by using a wooden pattern, etc. Of course, if a piece of pipe were not available, a wooden handle would suffice, providing it were straight.

Yours, etc.,

B. R. LOCK.

2, Buckwoods Road,
Braintree.
3.4.48.

Petrol for "C" Licence Holders

The Traders' Road Transport Association, the national organisation for "C" licence holders, issues a motor fuel warning to "C" vehicle users in its monthly bulletin. The Association points out that although the use of "C" vehicles for the carriage of goods for and in connection with the "C" licence holders own trade or business is not restricted under the provisions of the Road and Rail Traffic Act, 1933, under which Act the licences are granted, motor fuel rations are issued against applications specifying the purposes for which the fuel will be used.

The use of the motor fuel for any purpose other than that for which it is issued is illegal, and moreover if an operator applies for and receives motor fuel rations for use in a specified vehicle for carrying his own goods within, say, a radius of sixty miles, but uses the vehicle outside that radius, then he has committed an offence.

DR. W. D. JONES, managing director of Powder Metallurgy, Limited, is leaving for an extensive business tour of South Africa.

Orders in Council for a period not exceeding one year from the time when they would otherwise expire, but the Order must be laid before both Houses of Parliament. On the other hand, by similar procedure an Order in Council may provide for the discontinuance of any such Regulation on a date earlier than that laid down in the Act.

Company News

(Figures for previous year in brackets.)

Crossley Motors—Interim dividend of 7½%.

Walmsleys (Bury)—Interim dividend of 6% (same).

Sanbra—Final dividend 12½%, making 20% (17½%).

Humphreys—Dividend of 15% (same); bonus, nil (2½%).

British Roll Makers' Corporation—Dividend of 15% (same).

Power Securities Corporation—Dividend of 6% (same).

Vickers—Final dividend of 8½%, making 12½% (same).

Wm. Doxford & Sons—Interim dividend of 5% (same).

Enfield Cables—Final dividend of 3¾%, making 7½% (same).

Projectile & Engineering Company—Dividend of 10% (nil).

British Electric Resistance Company—Interim dividend of 5% (nil).

British Oxygen Company—Final dividend of 12%, making 20% (same).

John Summers & Sons—Final dividend of 6%, making 8½% (same).

B. Finch & Company—Final dividend of 24%, making 30% (same).

W. E. Hughes & Company—Final dividend of 30% (20%), making 40% (25%).

Louis G. Ford—Final dividend of 20% on larger capital (30%), making 15% (22½%).

Engineering Components—Final dividend of 15% and bonus of 5%, making 30% (same).

Manganese Bronze & Brass Company—Final dividend of 20% (22½%), making 30% (same).

Telegraph Construction & Maintenance Company—Final dividend of 5%, making 10% (same).

British United Shoe Machinery Company—Final dividend of 7½%, making 13½%, tax free (same).

Central Provinces Manganese Ore Company—Final dividend of 12½% (15%), making 20% (22½%), tax free.

Cammell Laird & Company—Final dividend of 7½% (8½%), making 12½% (same), less tax, and bonus of 3%, tax free (same).

Superheater Company—Final dividend of 25% (27½%, plus 2½%, tax free, from capital profits reserve), making 45% (42½%).

Hadfields—Final dividend of 12½%, making 17½% (same). Last year a bonus of 2½%, tax free, from capital profits reserve was also paid.

Sir William Arrol & Company—Net profit for 1947, £46,792 (£61,133); dividend of 25% (dividend 15% and bonus 15%); to contingencies, £10,000 (£20,000); forward, £62,886 (£58,967).

Waygood-Otis—Profit for 1947, after depreciation, taxation, etc., £50,986; to pensions reserve, £30,000; interim dividend of 17%; no final dividend is recommended; forward, £5,845.

John Dale—Profit for 1947, after charging profits tax 1947 and E.P.T. 1946, £85,423 (£40,941); to income tax, £31,500 (£12,366); plant replacement, £7,000 (nil); dividend of 20% (nil); forward, £131,282 (£97,353).

A. Reyrolle & Company—Dividend of 4% per annum from date of allotment to December 31, 1947, on redeemable preference shares, and a final dividend of 7½% (same) on the ordinary shares, making 12½% (same).

Economic Gas Boiler Company—Net profit for 1947, after taxation and depreciation, £8,230 (£8,358); to general reserve, £2,500 (same); written off goodwill, £1,500 (same); dividend of 20% (same); forward, £5,204 (£5,209).

Metropolitan Electric Cable & Construction Company—The directors, having declared as an interim dividend an amount equal to the total distribution for 1946, have resolved to make no recommendation for a final dividend.

Lanarkshire Steel Company—Profit for 1947, after tax and contingencies, £140,405 (£101,369); to depreciation, £50,000 (£63,000); general reserve, £40,000 (nil); directors' fees, £600 (same); dividend of 20% (15%); forward, £76,124 (£55,744).

Blaw Knox—Trading profit for 1947, £169,962; to directors' remuneration, £19,417; depreciation of fixed assets, £8,482; written off share issue expenses, £3,082; taxation, £72,054; final dividend of 20%, making 30%; forward, £242,411 (£199,425).

A. & S. Henry & Company—Profit for 1947, after tax, etc., £143,506 (£116,947); final dividend of 3%, making 6% (same) and bonus of 6½% (4%); staff benevolent fund, £5,000 (nil); general reserve, £35,000 (same); forward, £36,351 (£35,345).

Switchgear & Cowans—Profit for 1947, after expenses and depreciation, £52,653 (£4,609); to directors' fees, £500 (£425); profits tax, £8,550 (£700); income tax, £20,900 (£1,900); dividend of 20% (10%); to pension fund, £2,000 (nil); forward, £29,755 (£22,252).

Gandy Belt Manufacturing Company—Net profit for 1947, £120,227 (£92,466); to taxation reserve, £60,000 (£56,000); general reserve, £40,000 (nil); stock reserve, £2,000 (nil); contingency reserve, nil (£10,000); pension account, £10,000 (£5,000); dividend of 10% (same); forward, £22,572 (£21,357).

Prima Industries—Trading profit for 1947, £37,088; investment income, £128; to directors' remuneration and fees, £6,666; depreciation, £1,131; net profit, £29,419; to tax, £15,250; profit earned prior to incorporation, £5,586; dividend at the rate of 18% per annum from June 6, £5,077; forward, £3,506. The company was made public in July, 1947.

Heenan, Beddow & Sturmey—Trading profit for the year ended November 30, 1947, £16,196 (£30,206); dividend from subsidiary company, £2,695 (nil); transfer fees, £26 (£51); to directors' fees, £250 (£300); depreciation, £3,197 (£3,472); taxation, £6,500 (£8,469); net profit, £8,970 (£18,016); dividend of 15% (same); deferred repairs, nil (£10,000); forward, £26,860 (£23,459).

Bruntons (Musselburgh)—Trading profit for 1947, before tax and depreciation, £59,777 (£29,652 after tax and depreciation); investment income, £11,195 (£12,799); property income, £134 (£194); transfer fees, £11 (£20); to tax, £32,000; depreciation, £14,642; staff pensions, £1,513 (£1,214); directors' fees, £1,000 (same); net profit, £21,956 (£40,451); dividend of 15% (20%); forward, £54,599 (£61,517).

Rheostatic Company—Trading profit for the year to September 30, 1947, £89,437 (£64,056); other income, £517 (£34); to taxation, £32,770 (£28,500); depreciation, £18,248 (£12,427); directors' remuneration, £13,514 (£9,420); directors' fees, £250 (same); net profit, £25,172 (£13,493); dividend of 20% (14%); to general reserve, £11,500 (£3,500); investment reserve, nil (£421); forward, £5,380 (£5,128).

National Boiler & General Insurance Company—Profit and loss account for 1947 shows:—Transfer from revenue account, £125,416 (£167,673); interest, £27,956 (£28,275); sales department profit, £14,748 (£12,979); to pensions funds, etc., £56,333 (£62,630); tax, £64,436 (£76,325); reserve, £30,000 (same); dividend of 62s. per £10 share (60s.); forward, £104,631 (£112,855). Net premiums, etc., £765,062 (£700,260); claims, etc., £632,363 (£530,705).

Wallsend Slipway & Engineering Company—Trading profit for 1947, £287,752 (£240,681); provision made in previous years not required, £33,587 (£20,000); other income, £18,374 (£4,390); to directors' fees, £4,090 (same); depreciation, £30,000 (same); taxation, £137,698 (£106,462); net profit, £167,925 (£124,518); final dividend of 13%, making 20% (same), and bonus of 10% (same); to superannuation fund, £20,000 (same); general reserve, £85,000 (£50,000); forward, £48,992 (£38,844).

R. W. Crabtree & Sons—Trading profit for 1947, £111,990 (£108,643); other income, £17,744 (£17,863); to directors' fees, £1,450 (same); audit fee, £299 (£320); depreciation, £16,367 (£13,216); pension fund, £7,111 (£6,757); bank and debenture interest, nil (£4,183); buildings reserve, £2,000 (same); premium on debentures redeemed, nil (£998); income tax, £38,000; profits tax, £12,000 (income tax, £50,000); net profit, £52,507 (£47,582); dividend of 8% (same) and capital bonus of 5% not subject to tax out of capital reserve (same); to general reserve, £50,000 (same); forward, £52,083 (£66,364).

THE REQUISITE 90 per cent. of shareholders of Crossley Motors, Limited, have accepted the offer of the Associated Equipment Company, Limited, for their shares, and the fusion of the two companies was ratified at the A.E.C. extra ordinary general meeting on Monday.

German Foundry Production to be Doubled

In accordance with the planned production of 6 million metric tons of steel ingots during the period July 1, 1948, to June 30, 1949, German foundrymen expect the production of castings to total 1,200,000 tons for the same period, an increase of 90 per cent. over the 1947 figure. The actual increase, however, will be even higher. Production scheduled for the first half of 1949 exceeds that for the second half of 1948 by 30 per cent., and during the second quarter of 1949 there should be an increase by 128 per cent. over the three-monthly average of 1947, production in the second quarter of 1949 being at an annual rate of 1,440,000 tons.

As for the different categories, each of the three-monthly totals would comprise:—Iron castings, 85 per cent.; steel castings, 10 per cent.; and malleable castings, 5 per cent. The results would be as stated in the following table:—

	Production (1,000 tons).		
	Iron.	Steel.	Malleable.
1947, total	545	58	28
Average per quarter	136	15	7
1948—Third quarter	204	24	12
Last quarter	238	28	14
1949—First quarter	272	32	16
Second quarter	306	36	18
	Per cent.	Per cent.	Per cent.
1949—Second quarter, as against 1947 average	225	248	257

The targets indicated above cannot be achieved unless there are adequate allocations of pig-iron and scrap, coke, coal (brown-coal) briquettes, gas and electricity, core binders, timber, etc., and a labour force physically fit to achieve those results.

Contract Open

The dates given are the latest on which tenders will be accepted. The address is that from which forms of tender may be obtained.

Blackpool, April 26—Supply of 12,200 yds. of 36-in. dia. cast-iron pipes, etc. (contract No. 5); 14,500 yds. of 33-in. dia. cast-iron pipes, etc. (contract No. 6); sluice valves, 18 in. to 36 in. dia. (contract No. 8); air valves (contract No. 9), for the Fylde Water Board. Mr. H. W. Apted, engineer, Fylde Water Board, Sefton Street, Blackpool.

THE PARTNERSHIP BETWEEN Johann Bruno Bosscher and Ernest Channer, carrying on business as ship-repairers and marine engineers, at Chapel Wharf, Southampton, under the style of Bosscher & Channer, has been dissolved. Debts will be received and paid by Weeks Green & Company, 21, Cumberland Place, Southampton. The business will be carried on in future by each of the partners under the style of their respective names.

Personal

MR. WILLIAM DOWNS, Jr., has resigned from the board of Bairds & Scottish Steel, Limited.

MR. E. J. RONEY has been appointed to the board of the Ransome & Marles Bearing Company, Limited.

MR. ALAN R. BAILEY has been appointed Senior Lecturer in Metallurgy at the Constantine Technical College, Middlesbrough.

MR. W. O. STERN, who has been associated with Metal Traders, Limited, for many years, has been elected to a seat on the board.

MR. W. BALL, a member of the staff, has been appointed to the board of J. & E. Hall, Limited, engineers and ironfounders, of Dartford.

MR. J. A. MARTINO has been appointed a director of Goodlass Wall & Lead Industries, Limited, in place of MR. F. W. ROCKWELL, who has resigned.

MR. H. H. BRENTALL, departmental manager of the metal windows section of James Gibbons, Limited, Wolverhampton, has been appointed a director of the company.

MR. R. WOODS, managing director of the General Cable Manufacturing Company, Limited, has been elected chairman of the Independent Cable Makers' Association.

MR. J. R. BROCKHOUSE and MAJOR C. R. DIBBEN have been elected directors of J. Brockhouse & Company, Limited, manufacturers of springs and axles, etc., of West Bromwich.

MR. ALEX. MARSHALL has resigned his directorship of Wilson Bros. (Pipe Fittings), Limited, Glasgow, and has joined Albert Smith & Company, foundry engineers, etc., also of Glasgow.

MR. WILLIAM POSTGATE, secretary for 20 years of Blackett, Hutton & Company, Limited, steelfounders, of Guisborough, Yorks, has retired. He had been with the company for 50 years.

MR. B. W. LIVERMORE has been elected a director of Keith Blackman, Limited, engineers, fan makers, etc., of Tottenham, London, N.17, in place of MR. G. F. HERRON, who has resigned.

PROF. C. E. PEARSON is resigning this month from the William Cochrane Chair in Metallurgy at King's College, University of Durham, to take up a post with Durham Chemicals, Limited, Birtley.

MR. H. CUNNINGHAM has been appointed general manager of A. J. Riley & Son, Limited, boilermakers, of Batley. He was formerly commercial manager of the Redheugh Iron & Steel Company, Limited.

MR. G. GORDON JACKSON, managing director of the Glasgow Engineering Centre, flew to Sweden last week to establish contact there with firms anxious to do business with British engineering companies.

MR. E. C. DRAKE, secretary and chief accountant of Guest, Keen & Nettlefolds, Limited, has retired after 29 years' service. MR. W. A. NICOL has been appointed secretary, and MR. W. W. FEA chief accountant.

MR. J. HARRISON has retired from the position of assistant managing director of Walter Spencer & Company, Limited, steelmakers, etc., of Sheffield, and has relinquished his seat on the board. His services are being retained as technical adviser.

DR. R. J. SARJANT, Professor of Fuel Technology at Sheffield University, and formerly research director of Hadfields, Limited, Sheffield, recently left for America. He will visit various educational centres. Dr. Sarjant will be away until the end of May.

MR. ANDREW BANKS, who has acted as secretary of the North British Locomotive Company, Limited, Glasgow, for almost 30 years, has retired from that position and from the board of the company. He has been succeeded as secretary by MR. JAMES HAMILTON.

COL. W. C. DEVEREUX, managing director of Almin, Limited, manufacturers of light metals, of Farnham Royal, Bucks, took part on April 6 in a television feature dealing with inventions. He was a member of a panel of experts which judged the various inventions presented.

MR. G. FALK has resigned his chairmanship and joint managing directorship of Falk, Stadelmann & Company, Limited, manufacturers of heating and cooking appliances, of Birmingham and Wandsworth, London, S.W.18, owing to ill-health. He will retain his seat on the board. MR. H. FALK has been appointed chairman in addition to his office as managing director, and MR. R. STEWART has been appointed vice-chairman.

MR. ARNOLD WALTERS, a director of Farvalube, Limited, Denco Engineering Services, Limited, Foundry Mechanisations (Baillot), Limited, Wheeler & Walters, Limited, industrial development engineers, of Sheffield, and F. H. Wheeler (Sheffield), Limited, electrical and mechanical engineers and contractors, will be leaving next Thursday for a 10-weeks' business tour in the United States. He will visit many of the important American iron and steel plants.

MR. L. SATCHWELL has resigned his position as chairman of the Rheostatic Company, Limited, consequent upon his retirement from active participation in the company's affairs. He has consented to continue as a director in a consultative capacity. MRS. W. D. SATCHWELL has also retired from the board. MR. M. J. GARTSIDE has been appointed chairman, and LADY BARBER, MR. R. W. TOWERS and MR. H. C. E. MILLER have been appointed directors.

MR. W. J. BODDY, manager of the electrical construction department of the British Thomson-Houston Company, Limited, since 1918, has retired after 51 years' service with the company. He was associated with much of the company's pioneering work in electric traction, both road and rail, as well as with the electrification of industry. He also directed important construction work overseas. MR. A. S. KETTLE has been appointed manager of the construction department as from April 1, from which date all electrical, turbine and traction construction work will be carried out by this consolidated construction department.

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News in Brief

JOHN BAILEY (FOUNDERS), LIMITED, Blackburn, has changed its name to Graham & Brown, Limited.

THE DIRECTORS OF Ductile Steels, Limited, announce that negotiations have been completed for the purchase by the company of Dudley Port Rolling Mills, Limited, Tipton, Staffs.

THE NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD has placed contracts with Scottish Cables, Limited, Renfrew, for the manufacture and installation of 33,000-volt and other cables to the value of £80,000.

CONSIDERABLE DAMAGE was caused by fire last week to the premises of George Cohen, Sons & Company, Limited, iron, metal and machinery merchants, etc., at Sunbeam Road, Park Royal, London, N.W.10.

THE FIRM OF Matthew Whyte & Sons, engineers and machinery merchants, of Glasgow, of which Mr. A. Cameron Whyte was sole proprietor, has been sold to Mr. William Hutton, who will carry it on under the existing name on his own account.

SMITH & COMPANY (SOUTH SHIELDS), LIMITED, has completed a ship's propeller weighing over 21 tons, which is believed to be the biggest propeller to be cast in one section with boss and blades. The propeller took six days to cast. In 1937 the company made a propeller of 19 tons in one section.

THREE EMPLOYEES of Glenfield & Kennedy, Limited, hydraulic engineers and founders, of Kilmarnock, have been presented with gold medals to mark their 50 years' continuous service with the company. These presentations brought the number of gold medallists up to 79, of whom eight are still in the service of the company.

LIEUT.-GEN. SIR RONALD WEEKS is to be the first chairman of the National Advisory Council on education for industry and commerce. His appointment was announced by the Minister of Education last week. Sir Ronald is deputy chairman of Vickers, Limited, chairman of the English Steel Corporation, Limited, and a director of other companies.

SUBJECT TO the necessary resolutions being passed on April 29, the directors of Thomas Bolton & Sons, Limited, copper smelters and refiners, etc., of Widnes, are to offer for public subscription 600,000 new 4½ per cent. second cumulative redeemable preference shares of £1 each. Present stockholders, debenture holders, and employees will be given preferential allotment.

THE BRITISH BUREAU OF NON-FERROUS METAL STATISTICS, which has been founded jointly by the British Overseas Mining Association, the British Non-ferrous Smelters' Association, and the British Non-ferrous Metals Federation, will collect and publish comprehensive statistics relating to the production, consumption and stocks of non-ferrous metals in the United Kingdom and the British Commonwealth and Empire.

A CALL FOR a Government inquiry into redundancy at the Barton (near Manchester) works of Platt Bros. & Company, Limited, textile and general engineers, was made at a meeting in Manchester on April 4. The shop stewards at the works, backed by the Manchester and Salford Trades Council, asked that there should be a Government inquiry into their allegation of production restrictions. The explanation of the management was that anticipated orders had not materialised.

APPRENTICE PLATERS and shipwrights who have served between two and three years are eligible for prizes ranging from £25 to £50 a year for three years in connection with the prize scheme instituted by the Worshipful Company of Shipwrights. The competition is open to apprentices in any shipbuilding or shiprepairing yard in Great Britain or Northern Ireland. Details of the competition may be obtained from the Hon. Clerk, Worshipful Company of Shipwrights, 24, St. Mary Axe, London, E.C.3.

THE ADDRESS of the Export Promotion Department of the Board of Trade (with the exception of the exhibitions branch) is now Thames House North, Millbank, London, S.W.1. The telegraphic address is altered to Advantage, London, but the telephone number remains as hitherto (Victoria 9040). The exhibitions branch, which among other work deals with the British Industries Fair, will, for the time being, remain at the old address (35, Old Queen Street, S.W.1), but the telephone number has been changed to Abbey 9040.

IN AN INTERIM REPORT covering the half-year's operations to December 31 last, the chairman of Qualcast, Limited, foundrymen, etc., of Derby, states that in spite of shortages and inability to carry out schedules as planned, the company had the most satisfactory half-year in its history. Compared with the corresponding six months of 1946, the figures show that value of output increased by 33 per cent., tonnage of foundries increased by 30 per cent., and profit by 22 per cent. During the period under review the company operated at a still lower percentage of profit than last year.

Rhodesian Iron Development Plan

Following the recent announcement of the withdrawal of John Brown & Company, Limited, from the Rhodesian pig-iron and ferro-chrome development scheme, the British South Africa Company has authorised the Rhodesian Corporation and Sir Dennistoun Burney to state that the grant of the minerals concession will remain in their favour. The joint statement points out that, at the time of John Brown's withdrawal, the estimated tonnages as a result of the prospecting work which had been done in Northern Rhodesia were 800 million tons of high-grade iron ore—but containing too high a silicon content for satisfactory reduction—and 40 million tons of high-grade hematite. Since then further work has been done on the deposits, and reports have now been received that, contrary to initial advices, a large proportion of the 800 million tons deposit is low in silica, ranging from only 2 per cent. to under 7 per cent., and that this deposit is considerably greater than appeared when the estimates were made two months ago. In addition, further deposits of high-grade hematite have been discovered during this two months' period.

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Increases of Capital

Details of increased capital have been announced by the following companies:—

Spencer's Radiators, Limited, Nottingham, increased by £5,000, in £1 shares, beyond the registered capital of £2,000.

John Bailey (Founders), Limited, Blackburn, increased by £9,900, in £1 shares, beyond the registered capital of £100.

Ascania Engineering, Limited, London, S.W.5, increased by £4,000, in £1 shares, beyond the registered capital of £1,000.

Stroud Stokers, Limited, Stroud, Glos, increased by £18,500, in £1 ordinary shares, beyond the registered capital of £1,500.

Astral Engineering Company, Limited, Ponders End, increased by £9,900, in £1 ordinary shares, beyond the registered capital of £100.

York Metal Industries, Limited, Layerthorpe, York, increased by £1,000, in £1 ordinary shares, beyond the registered capital of £2,000.

Hattersley & Ridge, Limited, steelmakers, etc., of Sheffield, increased by £40,000, in £1 shares, beyond the registered capital of £10,000.

Wallis Tin Stamping Company, Limited, Poole, increased by £25,000, in 2s. ordinary shares, beyond the registered capital of £150,000.

I. Borovitch (Metals), Limited, Commercial Road, London, E.1, increased by £4,000, in £1 ordinary shares, beyond the registered capital of £1,000.

Abelson & Company (Engineers), Limited, Sheldon, Birmingham, increased by £2,000, in £1 ordinary shares, beyond the registered capital of £23,000.

Almag Engineering Company, Limited, Pembridge Road, London, W.11, increased by £14,900, in £1 ordinary shares, beyond the registered capital of £100.

Wilmans (Woodside), Limited, engineers, toolmakers, etc., of Birmingham, increased by £7,000, in 4,000 5s. ordinary shares and 6,000 £1 redeemable cumulative 5½ per cent. preference shares, beyond the registered capital of £3,000.

John Lysaght's Scunthorpe Works, Limited, increased by £1,699,000, in £1 ordinary shares, beyond the registered capital of £1,000. On February 4, 1948, 1,699,998 shares were allotted to John Lysaght, Limited, for the acquisition of that part of its business carried on at Scunthorpe.

Dewhurst & Partner, Limited, ironfounders, etc., of Hatton Garden, London, E.C.1, increased by £10,000, in 2s. ordinary shares, beyond the registered capital of £50,000. The original £1 ordinary shares have been sub-divided into ordinary shares of 2s. each. The company has been converted into a public company.

John Lysaght's Bristol Works, Limited, increased by £499,000, in £1 ordinary shares, beyond the registered capital of £1,000; 499,998 shares were allotted to John Lysaght, Limited, on February 4, 1948, for the acquisition by this company of that part of the undertaking of John Lysaght, Limited, previously carried on at Bristol, and at its constructional office in London, and at its branch office in Wellington, New Zealand.

Obituary

MR. PARKIN JOHNSON, iron and steel merchant, of Sheffield, died recently.

MR GEORGE TOWERS ADDISON, late chief accountant of Babcock & Wilcox, Limited, died suddenly on April 2. He was in his 74th year.

MR. EDWIN JACOB, who died last week, was a director of the Rail & Structural Welding Company, Limited, Kennington, London, S.E.11.

MR. WILLIAM JOHN QUIXLEY, overseas manager of the Monotype Corporation, Limited, manufacturers of typecasting and setting machinery, of Redhill, died suddenly on April 4.

MR. CHARLES SPICK, a retired iron, steel and machinery merchant, of Grantham, has died after a short illness at the age of 68. His firm, Charles Spick & Company, is now carried on by his three sons.

MR. W. COLIN GRANT SMITH, who died on April 1 at the age of 77, was probably the oldest practising accountant in Wolverhampton. He was secretary of the Willenhall and District Ironfounders' Manufacturers' Association.

MR. JAMES THOMSON MACLEOD, who has died at Glasgow in his 78th year, was the founder and for many years chairman and managing director of J. Thomson Macleod, Limited, tool merchants and agents, of Glasgow, and of the North British Lifting & Moving Appliance Company, Limited, also of Glasgow.

MR. WILLIAM TODD, who died on April 2, was associated with David Rowan & Company, Limited, marine engineers and boilermakers, of Glasgow, for almost 50 years. He served successively as head foreman, works manager, and general manager, and was later appointed a director. Mr. Todd was a past-president of the North-West Engineering Trades Employers' Association. He was 80 years of age.

Recent Wills

GREEN, H. W., of Stourbridge, Worcs, steel merchants' director	£13,313
CARLAW, A. L., a director of David Carlaw & Sons, Limited, printers' engineers, of Glasgow ...	£221,111
STILLING, W. H., late of Isaac Braithwaite & Son Engineers, Limited, Kendal, Westmorland ...	£3,772
SCULLY, HENRY, a director of Barclay, Curle & Company, Limited, shipbuilders and engineers, of Glasgow	£19,907
COCKADAY, WALTER, who represented the Standard Engineering Company, Limited, Leicester, in the North of England	£1,371
HOGG, JAMES, engineer-representative of Watson, Laidlaw & Company, Limited, manufacturers of sugar and laundry machinery, etc., of Glasgow...	£1,058

H.M. DOCKYARD, Pembroke Dock, has been taken over from the Admiralty by R. S. Hayes, Limited, Bridgend, Glam. The company is now able to undertake work as shiprepairers, shipbreakers, boilermakers and engineers, brass and iron founders, etc.

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Raw Material Markets

Iron and Steel

Inadequate supplies of pig-iron and scrap constitute a problem which calls for immediate attention. Works which have in hand half their normal stocks can count themselves fortunate; many have a good deal less than this amount. Makers of light castings are not getting nearly enough high-phosphorus iron to enable them to keep in full production, and other engineering and jobbing foundries have often to "make do" with unsuitable mixtures owing to temporary shortages.

British steelmakers are now supplying bigger tonnages of semis for the re-rolling industry than ever before in their history. But there is still a gap between supply and demand, and negotiations are continuing in the hope of securing more material from Continental and Dominion sources. Hopes are also entertained that American aid under the Marshall plan may embrace the shipment of semi-finished steel to this country. In the meantime, re-rollers are making use of discards and scrap to eke out their deliveries of billets, blooms, etc., but the mills engaged on light sections are handicapped by the scarcity of 2-in. to 3-in. billets.

Cancellation of so many uncompleted orders for heavy steel products at the end of March has swollen to vast dimensions the applications for new authorisations and, as each of these is subject to careful scrutiny, some time must elapse before they can all be dealt with. Meanwhile, however, the works have in hand an abundance of specifications to keep them fully occupied. The demand for plates, especially the lighter gauges, is exceptionally heavy, and there are far more export inquiries than can be entertained. Tube makers are making a big contribution to the rising total tonnage of shipments overseas, and the demand for black and galvanised sheets is such that export prices have been advanced respectively by 10s. and 20s. per ton.

Non-ferrous Metals

With the unexpectedness characteristic of the present-day set-up in non-ferrous metals, the American lead producers announced last week an advance in the price of their metal. The rise was considerable—2½ cents per lb.—and it takes the quotation up to 17½ cents, which constitutes a new high record for the metal. Expressed in sterling, the appreciation in value is about £14 per ton, but initial reactions on this side were that the authorities here certainly would not go all the way in following the change. In some ways the rise was not altogether unexpected, for the strike at the Mexican mines had brought about a condition of scarcity which led to consumers paying premiums for much-needed metal. But work was resumed at most of the Mexican properties some time ago and it appeared as if we had got through this unfortunate affair without any untoward developments. It really does seem as if the rise to 17½ cents is hardly justified by the economics of the situation, for there has not been any increase in the overall rate of lead consumption. It appears that some U.S. consumers, caught short of metal, succeeded in covering their needs in Europe at something over 16 cents. To this, ocean freight, insurance and import duty had to be added, the resultant cost amounting to approximately 17½ cents. Hence the advance, which does not appear to rest on a very firm foundation. However, Canada has followed the American lead and has put the quotation in the Dominion up by 2½ cents also, so that it is going to be very difficult in the days lying ahead to obtain any cheap metal.

Actually, judging from reports coming across the Atlantic, it looks very much as if a decidedly bullish view were being taken in the United States of the outlook for non-ferrous metal values, and people are talking of the possibility of a rise in zinc and copper. This bullish atmosphere is unfortunate and is to be deplored, for metal values are already much too high and will some day suffer a very severe setback. But in the absence of a free market in London, which would reflect some of the selling pressure undoubtedly in existence, it is a little difficult to see how this tendency is to be resisted. The fact is that we are geared to the "high-speed economy" of the United States and must inevitably be fated to accept the price level ruling there in respect of such commodities as we have to import from dollar areas. But the matter goes further than that, for America does in fact establish the world price for nearly everything. How long will it be before the Government realises the wisdom of re-establishing our futures markets in the United Kingdom?

New Companies

("Limited" is understood. Figures indicate capital. Names are of directors unless otherwise stated. Information compiled by Jordan & Sons, 116, Chancery Lane, London, W.C.2.)

William Waugh, 6, Dumbiedykes Road, Edinburgh—Metals, plant, and machinery dealers. £20,000. J. and D. W. Waugh.

Plessey International—To develop and export electrical and mechanical apparatus and appliances, etc. £50,000. A. G. Clark, 17, Ennismore Gardens, London, S.W.7, subscriber.

Lilleshall Iron & Steel Company—To acquire that branch of the business of the Lilleshall Company which relates to the iron and steel trades. £100. J. W. Burne, Church Aston Manor, Newport, Salop, subscriber.

J. C. Mitchell & Son (Shroton), The Laurels, Shroton, Blandford, Dorset—Manufacturers of agricultural and contractors' plant and machinery, etc. £3,000. G. C. Mitchell, W. F. Cox, and D. G. Ford.

THE VIEW THAT a foundry was not wanted in a holiday resort was expressed by several members of Bridlington Town Council when discussing an application by Hayes Engineers (Leeds), Limited, for permission to build a foundry and engineering works on a 6-acre site. Four members of the Council will visit the company's Leeds factory to inspect the processes proposed to be used at Bridlington.